MS-EXCEL FOR CHARTERED ACCOUNTANTS

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1 Basics & Beyond..

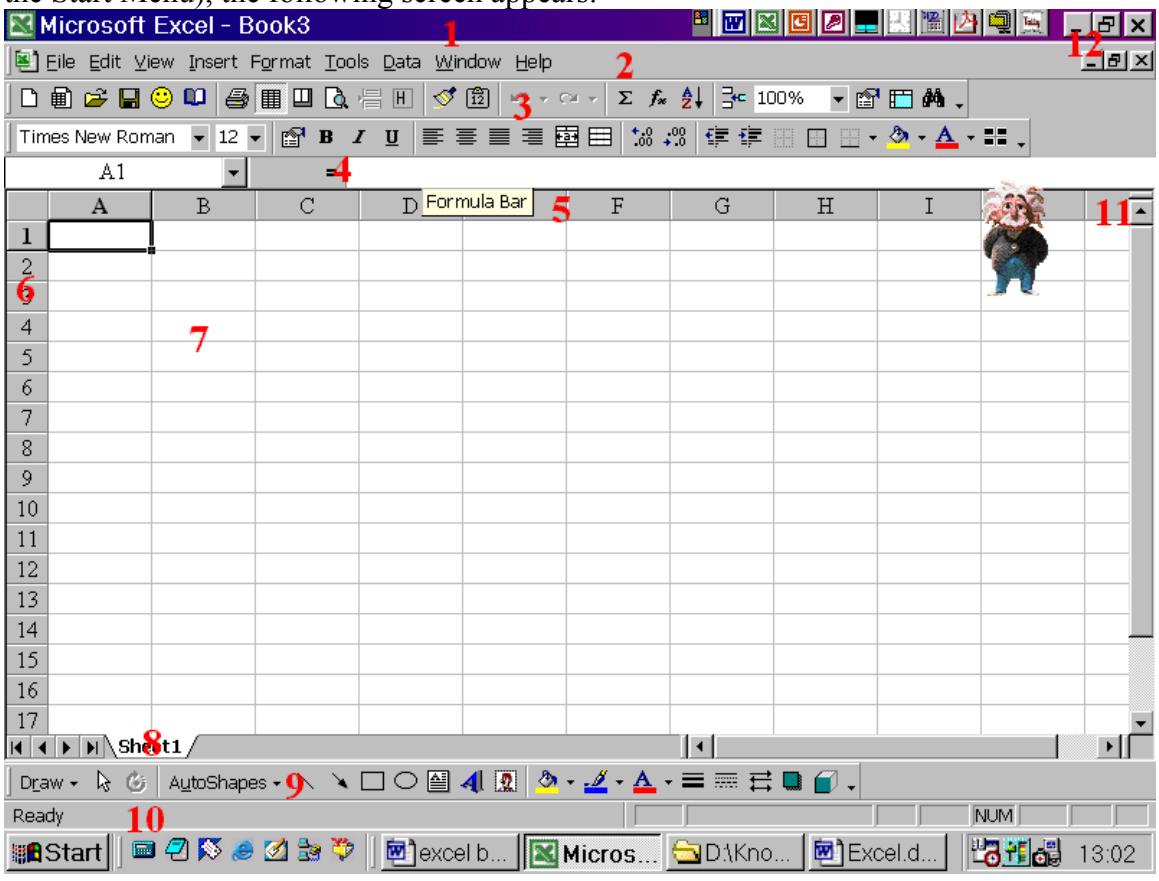
1.1 Introduction

Microsoft Excel is a spreadsheet program that is designed to record and analyze numbers and data. Excel is very widely used for accounting and financial purposes.

The files created in Excel are known as workbooks. In turn, each workbook can contain one or more worksheets. An Excel worksheet is laid out like a grid with horizontal rows and vertical columns. Columns are labeled with alphabets (A, B, C, etc.) while rows are given numbers (1, 2, 3, etc.). The intersection of a row and a column is called a cell. A cell is referred by a combination of column alphabet and row number (A1, A2, etc.). A cell is a primary unit of measure in Excel and all the information is stored in cells. . A range is a collection of contiguous cells (which form a rectangular block) on which the user wants to perform similar type of calculations. A range is referred to by a combination of the cell addresses of the diagonally opposite cells separated by a colon (A1:D6)

1.2 The EXCEL Screen

On loading MS-EXCEL (either through the shortcut menu, or icon on desktop or through the Start Menu), the following screen appears:



The various components of the EXCEL Screen are explained in brief below:

Sr.	Contains	Remarks
1	Title Bar	Contains the name of the File currently open and also has the window control buttons to either close or minimize the program0
2	Menu Bar	Contains the list of various commands that can be performed in MS-EXCEL. It can be invoked either by a mouse click or the Alt Key from the keyboard
3	Tool Bars	Contain buttons for some commonly performed tasks. The commands can be activated by a mere mouse-click
4	Formula Bar	Displays the content of the active cell. The left hand side of this bar includes the name box which contains the list of all the range names and thereby facilitates quicker worksheet navigation
5	Column Labels	Contains the headings of the columns. Can be used for column-wide operations like increasing column width, hiding columns, formatting entire columns, etc.
6	Row Labels	Contains the headings of the rows. Can be used for row-wide operations like increasing row height, hiding rows, formatting entire rows, etc.
7	Sheet Area	The place where the actual data is entered. The Active Cell is surrounded by a dark rectangle.
8	Sheet Tab	Gives reference to the sheet which is currently active. One can quickly navigate through different sheets from here
9	Additional Tool Bars	Some additional toolbars
10	Status Bar	Includes the various information sent by EXCEL. Of particular use is the QuickSum Feature in the status bar which automatically displays the totals of the selected cells
11	Scroll Bars & Split Indicator	The Scroll Bars can be used for quick movement within a worksheet. The extreme top of the vertical scroll bar and the extreme right of the horizontal scroll bar contain a split indicator which permits the user to divide the sheet into two parts.
12	Application Control Buttons	These buttons are used to minimize or control the size of a particular file.

The cell A1 is surrounded with dark rectangular block. It is the active cell. Any entry of data is made into the active cell.

1.3 Moving Around

A worksheet can contain upto 65,536 rows and 256 columns whereas the visibility of the information on the screen is restricted to the size of the screen (generally 18-20 rows and 8-10 columns are visible at a time). Therefore, one may need to move around different

sections of a worksheet. There are various ways in which one can move around very efficiently.

1.3.1 Keyboard Shortcuts

The most widely used option is of course a wheel-mouse but at times, the keyboard is very handy. For example, to reach the last entered cell in a worksheet one just uses the <Ctrl>+<End> combination. Similarly, <Ctrl>+<Home> takes one to the first cell of the worksheet (which is always A1). Using <Home> takes one to the first cell of the particular row. <End> can be used with the combination of the arrow keys to reach at the end of the list in the particular direction. A complete list of keyboard shortcuts is provided in Annexure "A"

1.3.2 Range Names

Sometimes it is convenient to use a descriptive name to name a cell or a range of cells. Named ranges can also be used in formulas and functions. To name a range:

1. Select the range to be named.
2. Click the Name box on the left side of the formula bar
3. Type the range name (up to 255 characters). Valid names cannot use spaces and the first character must not be a number. Also, the name cannot look like a cell address such as B14.
4. Press Enter.

OR

1. Select the range
2. Select Insert/Name
3. Choose Define
4. Type the name of the range.

Once a particular range has been named, reaching that particular cell is very easy. Just choose the range name from the Name Box and you are taken there.

1.3.3 Window Split & Freeze

Many a times, one wants to refer to two different sections of a worksheet. For example, in case of a long list, the headings might scroll up. In that event, one can consider to split the window into two parts. One can split the windows by dragging the split handle which appears at the extreme top of the vertical scroll bar and the extreme right of the horizontal scroll bar. In the alternative, one can position the cell pointer to the cell where one desires a split and choose the command Split from the Window Menu. To remove the split, either re-drag the split bar or choose Window->Unsplit.

While the movement of the split windows is synchronized, none of them is fixed. Therefore, it is possible to loose track of the titles if the mouse movements are not properly handled. To avoid such a situation, one can choose Window->Freeze Panes. To reverse the process, choose Window->Unfreeze Panes.

1.3.4 Multiple Windows

Windows Split does not permit asynchronous viewing. For such a purpose, one can consider opening multiple windows of the same file. To do this, choose Window-> New Window. Re-size both the windows using the mouse pointer. Of course, multiple windows of the same file are at times confusing to handle.

2 Data Entry

Information entered into a cell is understood either as a text entry, a value or a formula. Functions are also treated equivalent to formulae. Dates, time and percentages are stored as numbers (values). It is important that a particular information is stored in the correct format.

2.1 Text

Text entries or labels can contain any combination of letters, numbers and spaces. A label which is too long for the width of a cell floats across the cells to its right / left / both (depending on the alignment of the cell) as long as those cells do not contain any information. If the cells aren't empty, the label is truncated or cut-off. By default, labels are left-justified.

2.2 Number (including date, time, percent)

Numbers and text are treated differently. The default alignment for text is left whereas for numbers, it is right. Secondly, if a value is too large to fit in the current cell width, Excel displays a series of # characters as a error signal. A list of various error signals and what they denote is enclosed as Annexure "C". Values are displayed in the General Number Format. This display can be customized using the Format Cells command.

2.3 Formulae

A cell can also derive the value though a formula. The building of a formula is intuitive and can be easily mastered through practice. For example, if Cell A1 contains 3000 being the tax payable and you want to calculate the surcharge, go to Cell A2 and type the formula +A1*5% (as the surcharge rate is 5%) and Excel does the calculation for you. To get the gross tax liability, go to Cell A3 and say +A1+A2 (as gross tax includes tax and surcharge). The formula can also be built by pointing to the dependent cells instead of typing the cell address. Excel evaluates a formula in a particular order of precedence. The operators used in a formula and precedence accorded by EXCEL are as under:

Operator	**Description**	**Precedence**
:	Range of Cells	1
,	Union of Cells	2
%	Percentage	3
^	Exponentiation	4
*	Multiplication	5
/	Division	6
+	Addition	7
-	Subtraction	8
&	Concatenation	9
= < >	Comparison Operators	10

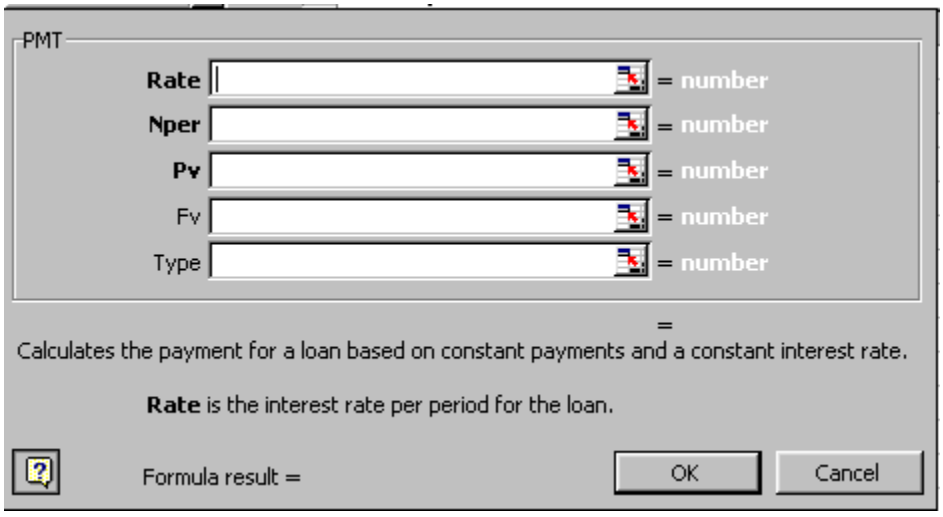
If the order of evaluation is to be changed, parenthesis should be used to group expressions within a formula. If more than one pair of parenthesis is present in a formula, Excel evaluates the expression in the innermost parenthesis first.

2.4 Functions

A cell can also derive its value through functions. Functions are processes, which have been defined and standardized by Excel. A complete list of functions can be found at Insert -> Function. A list of commonly used functions is enclosed as "Annexure B". Few more common functions include the SUM function (which totals all the numbers in a particular range – of course, EXCEL also has the QuickSum Feature which displays the sum of the selected range in the bottom pane) and the IF function used to manage alternate calculations in varying situations (it is very simple to use and can be nested, but take care to use the brackets appropriately otherwise the results can be disastrous!). A very common example of the use of IF function is to calculate the tax payable by an individual. For example, if cell B3 contains the net taxable income of an individual, the tax payable by him (excluding surcharge) can be calculated using a nested IF function as stated: =IF(B3>150000,(+B3-150000)*0.3+19000,*IF(B3>60000,(B3-60000)*0.2+1000,* ***IF(B3>50000,(B3-50000)*0.1,0))***)

2.4.1 Using the Function Builder

A function takes in certain standard arguments, undertakes the evaluation process and returns a particular result. In case one is unaware of the arguments, one can type the function name along with the opening parenthesis and click on the = sign on the Formula Bar. The Function Wizard presents the list of arguments and the brief description of the arguments. In such a fashion, one can build a formula through a Wizard and simultaneously learn the function itself. For example, the Function Builder Dialog Box in the case of PMT function is shown below:



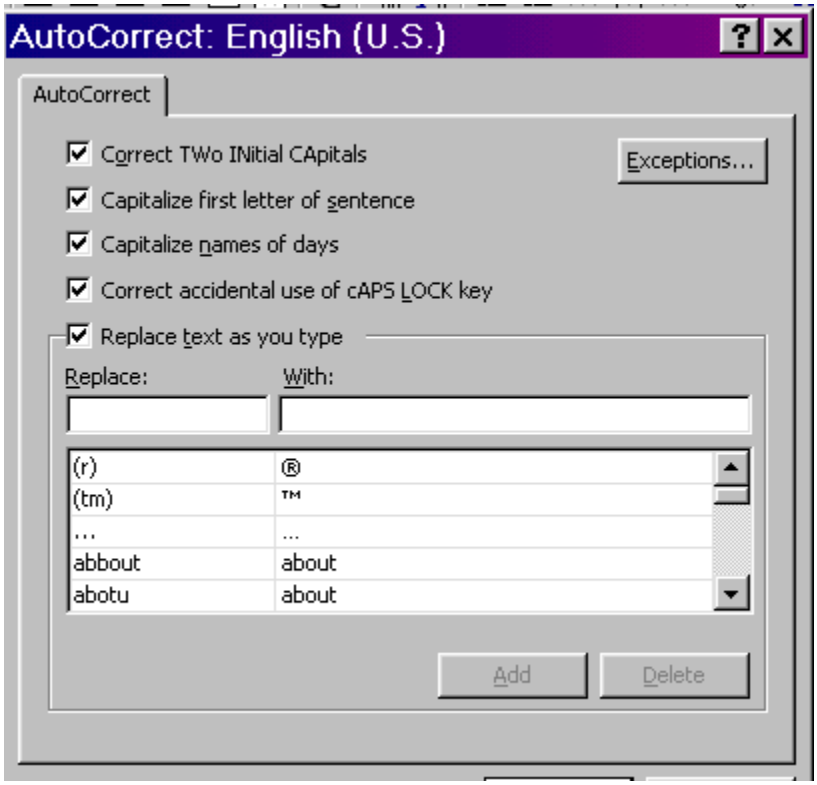
2.5 AutoComplete

Manual data entry into a range of cells can be made faster with the assistance of AutoComplete - a feature which suggests the current cell entry based on the existing list. It should however be noted that AutoComplete has certain limitations – it does not work

if there is a blank cell in the list, it works only when a unique combination consisting of at least one alphabet is met in the list. In case of multiple similar entries, a better option is the Pick from List which appears in the right-click shortcut of the mouse.

2.6 AutoCorrect

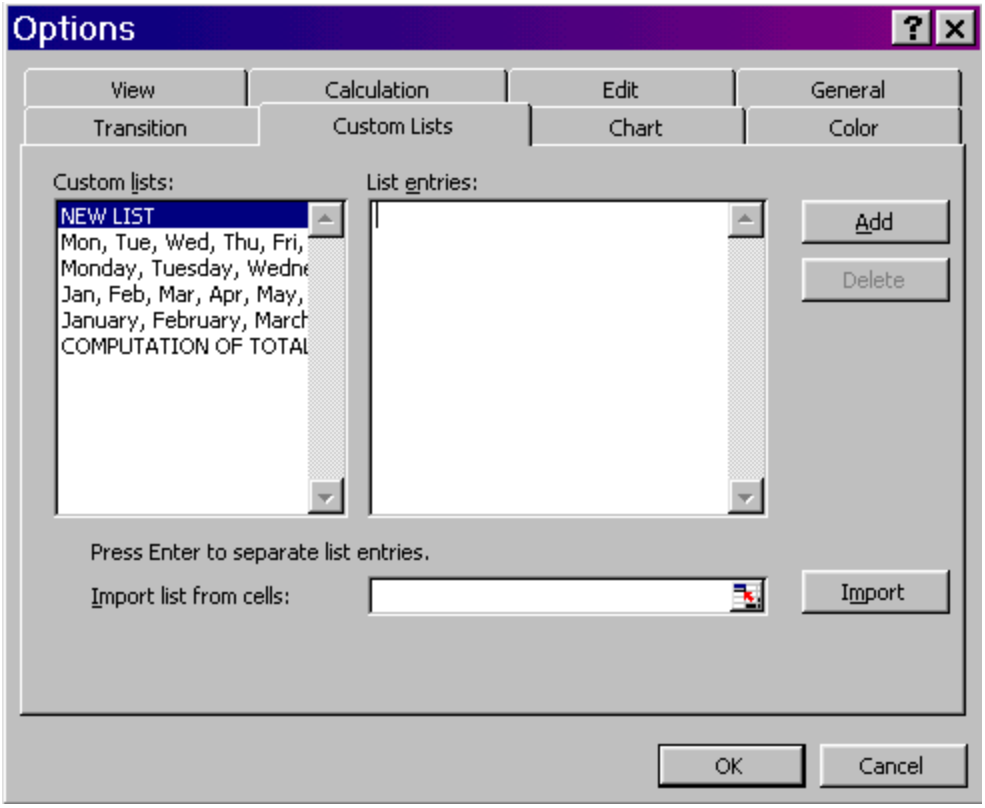
The AutoCorrect feature automatically corrects common typing errors as you type. For this purpose, Excel uses a database of commonly misspelled words. This database can be customized from the Tools -> AutoCorrect Menu. The following screen comes up:



One can use the AutoCorrect feature to quickly type some normal text which is regularly used in an organization. For example, the organization name can be made a subject matter of AutoCorrect to speeden up data entry.

2.7 AutoFill

AutoFill is an in-built feature whereby one can fill up a particular range of cells based on some pre-determined series. For example, if one cell contains January and the next one contains February, one can just use the fill handle to automatically complete the entire range with the month names. One can create custom lists pertaining to one's organization (for example, plant locations) from Tools -> Options -> Custom Lists. The following screen appears where one can either type in the required items or pick from a range of cells

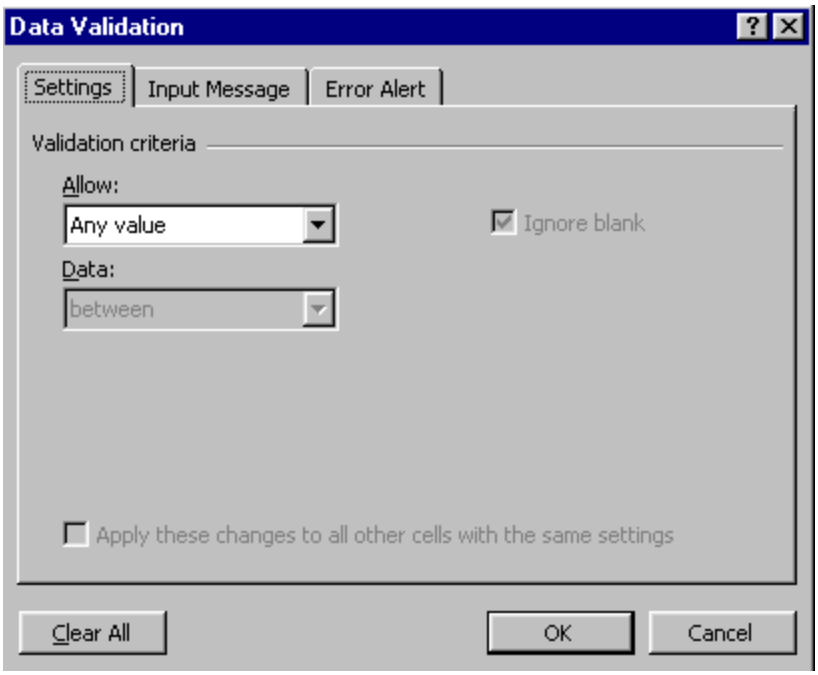


2.8 Data Validation

At times, there may be a need to restrict the content that is being typed into a particular cell. For example, one may want the residential status to be either "Resident" or "Resident but Not Ordinarily Resident" or "Non Resident". In such a case, the entry into a particular cell can be validated through the "Data Validation" Feature. The steps for data validation feature are explained below:

1. Select the cell/range for which validation is to be applied

2. Choose Data -> Validation from the menu. The following screen appears



3. This feature validates only Keyboard Input that too in cases where the entry is made after the validations are set and hence may have limitations

4. The user can choose the type of data and the range of data (which may be open-ended from one side). Alternatively, the user can specify a pre-defined list to choose from

5. The user can also specify the action to be taken in case the data entered is invalid

- ”STOP” does not permit entry of invalid Data
- “WARNING” allows alteration to invalid data. The user may still continue with the invalid data
- “INFORMATION” just informs about the invalid data
- Unchecking the “CHECK BOX” on the top allows entry of invalid data without any disturbance

6. The Auditing Toolbar (Tools -> Auditing -> Show Auditing Toolbar) contains icon which enables the circling of invalid data for attention (second last icon on the toolbar)

3 Totals & More..

Totalling is one of the basis requirement of any spreadsheet application. Consider the situation wherein the information of daily sales is entered in column B from rows 2 to 8. We are interested in calculating the weekly sales.

3.1 + + + ,…. why not?

One of the ways to calculate the weekly sales would be to use the formula +B2+B3…+B8. This however is not the ideal means for multiple reasons:

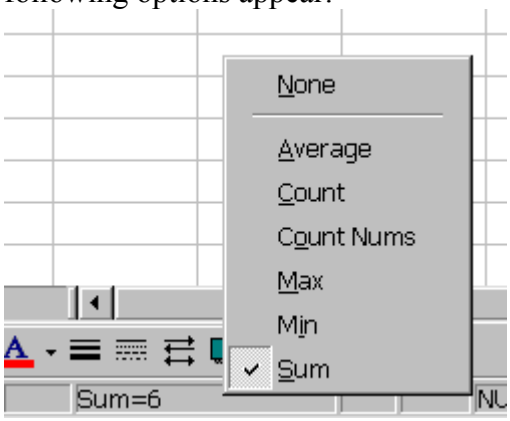
1. The length of the formula can become prohibitive
2. If one of the cells is later deleted, the result would display an error message
3. If an additional cell is later inserted, the value therein would not figure in the total

3.2 SUM() Function

The ideal way to total a particular range of numbers is therefore to use the SUM() function. The standard usage of the SUM function has already been considered. Of importance to note is the fact that one can total multiple non-contiguous ranges using a single SUM function. Just separate the range addresses by a comma. One can also use range names instead of the cell attributes to make the function more meaningful for the users.

3.3 QuickSum

Many a times, one just wants to refer to the total of a particular range of cells. For this purpose, one need not insert the SUM function and delete it thereafter. MS-EXCEL presents built-in totals on selection of a range at the status bar which appears at the bottom of the sheet. Even the Quicksum feature can be customized to show either the total or the maximum, minimum, average, count, numeric counts and so on. To customize the Quicksum feature, rightclick at the place where the sum is displayed and the following options appear:



Choose the relevant option. For example, if I am interested in finding the maximum value in a particular range, I shall choose Max.

3.4 SUBTOTAL() Function

In case there are nested totals, the SUM function can create havoc as there would be multiple totals. In such a situation one can consider the use of SUBTOTAL() function. This function avoids the cascading effect of the SUM function by recognizing the multi-layered totaling feature. Accordingly, a subtotal function ignores the value of another subtotal function in the selected range of cells. The subtotal function is not restricted merely to the summation but can also be used for counts, etc. Accordingly, the SUBTOTAL() Function requires an additional argument which is the function number. The various function numbers and the action performed by them are tabulated below:

Function Number	Action
1	AVERAGE
2	COUNT
3	COUNTA
4	MAX
5	MIN
6	PRODUCT
7	STDEV
8	STDEVP
9	SUM
10	VAR
11	VARP

Accordingly, to get a subtotal of the cells in A2 to A9, one will use the function =SUBTOTAL(9,A2:A9)

3.5 SUMIF() Function

There might be situations wherein one wants to total only particular values within a list. In such a scenario, one can use the SUMIF() Function. This function evaluates the values for a specific condition and accordingly includes them for summation. The arguments for the SUMIF Function are:

Criteria Range: The range specifying the parameter or the condition
Criteria: The exact condition
Sum Range: The values to total

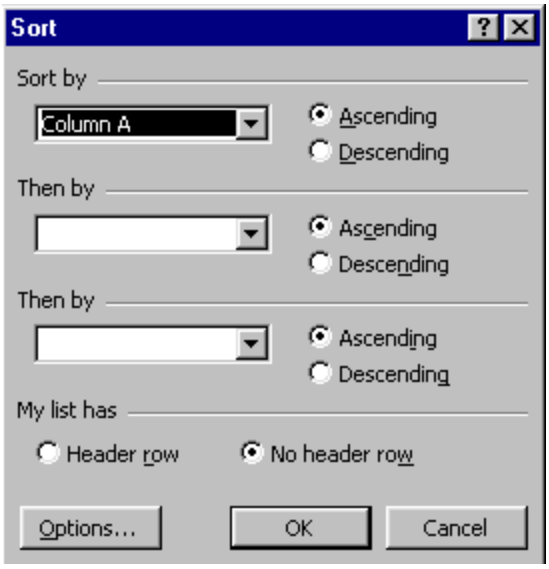
A cousin of SUMIF() Function is the COUNTIF() Function which counts the number of cells satisfying a particular criteria. In fact, the COUNTIF() Function can be combined with the Data Validation Feature to effectively stop the input of duplicate entries within a range of cells.

3.6 Sorting Data

In case a list of data is typed, one may need the data arranged in a particular fashion. For example, you may want your client details either alphabetically or based on the client codes. This is where sorting is useful and the same is very simple. Choose the relevant command from the Data Menu and the Sort Wizard takes you through the rest of the process. Remember, sorted data is always advantageous from three counts: firstly, it

improves readability, secondly, it permits effective lookups and lastly, it lays down the foundation for data grouping and sub-totalling.

- Sorting is a permanent process as compared to filtering which is a temporary process
- Choose any cell in the data range and Select Data -> Sort
- Choose successive sort keys and sort order



On a brief review of the above screen, one understands that the sort function permits sorting only upto three levels of data. If sorting is required for multiple levels of data, then one will have to use the sort function more than once. Sort first based on keys of least significance and move to keys of higher significance.

3.7 Sub-Totals

At times, there is a need to not only have grand totals but also subtotals – would you not like to have group-wise outstanding as well as total outstanding? For this purpose, one can use the Subtotals Function in the Data Menu. The Function is versatile and permits to have multiple levels of subtotals (for having such multiple levels, do not replace the current subtotals). Only care required is to sort the list in the same order of subtotalling before using the subtotals command otherwise you might end up in a mess. One can also consider the use of page-break option if you want individual reports for individual groups. And if things appear messy, just remove all subtotals and Start Afresh!

To subtotal data in a spreadsheet follow these steps:

1. Decide upon the column you wish to use for the subtotal.
2. Sort the data using the criterion you selected in step 1.

3. Select Data/Subtotal. Complete the subtotal window that appears and click OK.
4. Subtotals will now appear in the spreadsheet. Subtotals can be isolated from raw data using the gray view bar to the left. Clicking the (-) boxes will reduce data, clicking the (+) box will restore data.
5. Clicking the small 1,2,3, boxes in the upper left corner will reduce or expand all categories of data simultaneously.
6. To remove subtotals select Data/Subtotal and click on the "Remove All" button.

3.8 Conditional Sum Add-In

The SUM function is too simplistic in the sense that it does not permit multiple layering nor does it accept conditions. The SUBTOTALS feature permits multiple layering but is highly inflexible in approach. To incorporate complicated and specialised tasks, Microsoft Excel ships with certain add-ins. Each add-in performs certain tasks and has to be loaded specifically before it can be used. A complete list of add-ins is given in Annexure "D". The process of loading an add-in is simple. For conditionally totalling a particular list, consider the use of the Conditional Sum Wizard Add-in. The Wizard is too simple to be true!

- Choose Tools -> Wizard -> Conditional Sum
- Select the list as the range, select the value to sum and specify criteria
- To make the function dynamic, copy both the formula and condition

4 Queries in Lists

4.1 AutoFilter

In case of multiple records and large databases, there may be a need to restrict the report to certain types of transactions. For example, if you are maintaining your sale details in MS-EXCEL, you may be interested in a quick list of all the sales made to a particular customer. This requirement is known as a query. Again, Excel has an excel-lent (!) feature to do this. One just needs to use it to believe it. Yes, we are talking of AutoFilter – the feature which displays a subset of data without actually sorting or moving data. Once you select the AutoFilter command from the Data Menu, Excel inserts drop down arrows next to column headings in the list. Selecting an item from a drop down list hides all rows except rows that contain the selected value. One can edit and format the cells which are visible.

- Choose any cell in the data range and Select Data -> Filter -> AutoFilter
- Use the drop down lists to specify criteria. Criteria can be

1. Particular Value
2. Top/Bottom (no of items) in terms of value or percentage
3. Range through Custom Criteria
4. Blanks/ Non-Blanks

- Various criteria in differing columns are cumulative (AND) condition
- Remove criteria in specific column by choosing "All" from the drop down list
- Remove criteria in all columns by choosing Data -> Filter -> Show All

4.2 Advanced Filter

The filtered data can also be copied into another area by the simple process of copy-paste. One limitation of AutoFilter is that one can have multiple alternative criteria (OR condition to be more specific) for a single field, one can also have cumulative multiple criteria (AND condition) across multiple fields but one cannot have alternative multiple criteria across various fields. To cover such complex searches, one has to take recourse to the Advanced Filter Option. Here, one specifies the conditions in a separate range known as the criterion range. The results can be filtered in the original list or in another range of cells.

- Useful for specifying criteria which are alternative in nature (OR) condition

- Make use of a “criteria range”
- Select Data -> Filter -> Advanced Filter
- The filtered data may be copied to another range for subsequent analysis
- Revert back to original data by choosing Data -> Filter -> Show All

The Advanced Filter can also be used to delete duplicate records in Microsoft Excel. For this one needs to filter for unique records and then use the resulting rows to overwrite the source cells. The entire procedure is summarized in the table given below:

1. In the list you want to filter, select the column or click a cell.
2. On the Data menu, point to Filter, and then click Advanced Filter.
3. In the Advanced Filter dialog box, click Copy to another location.
4. In the Copy to box, type a cell reference.
5. Select the Unique records only check box, and then click OK.
6. Select the data returned by the filter, and then click Cut on the toolbar.
7. Select the source data, and then click Paste on the toolbar.

5 Functions

5.1 Lookup Functions

The value of a cell can also be derived from (looked up from) a pre-defined list. In this regard, it is important that the list to be looked up from should be in the same worksheet and should be sorted. Consider creating a list of status codes applicable to an assessee. The list of status codes and the description is entered in a separate area of the worksheet (ideally the record section should be reasonably far from the data section – for easy navigation, the record section may be appropriately named using a descriptive range name.) On selection of an appropriate status code, Excel can look up the status description from the list. There could be many instances where the lookup facility can be put to practical use – referring the client particulars from the client database, etc. In this regard, one may use the built-in functions of HLOOKUP or VLOOKUP or one may choose to build the function through the use of the Lookup Wizard, an Add-in which ships with MS-EXCEL. But to repeat, remember to sort the record section before you use the lookup functions. (For sorting records, refer to Data -> Sort)

1. =VLOOKUP() can be used for columnar search and =HLOOKUP() can be used for a row-wise search The arguments are:
   - The Lookup Value
   - The table range
   - The particular number of row or column in the table range

2. =INDEX() in its simplified version finds the intersection of a particular row and column references. The arguments include: table range, row number & column number. However, the row and column numbers can be made dynamic through the use of =MATCH() command and this gives the functionality to the INDEX() function. Such process is inbuilt in the Lookup Wizard
3. One can also build the function through the Lookup Wizard. Follow these simple instructions:-
   a. Select Tools -> Wizard -> Lookup
   b. Follow the instructions in choosing the row, column and the range
   c. To make the lookup dynamic, copy both the formula and lookup parameters

5.2 Date Functions

EXCEL stores dates as numbers. (also known as date serial number) Conceptually a date is stored as the number of days elapsed since 1st January 1900. To check this out, open a blank sheet and type 1 in one of the cells. Format that number as a date (Format->Cells->Date). The resultant display is “01-01-00” which represents 1st January 1900. When a date is directly entered into a cell, EXCEL automatically applies the date format and stores the date serial number. Enter a date like 07-08-02 in one of the blank cells. Now change the format of the cell as number (Format -> Cells -> Number). The display

changes to 37475. If it doesn't the date is entered in text format. Check the display orientation. Most probably, it will be left aligned!

How is this mode of internal storage of any relevance to us? It is, because it helps us appreciate the limitations faced by EXCEL while manipulating dates. The first limitation of EXCEL is that since dates are not stored as dates but as numbers, certain calculations based on months and years have to be derived through formulae and cannot be in-built. You would like to automatically calculate the rebate available for senior citizens based on the date of birth. Let us say the date of birth is 17th March 1938 and we are interested in knowing whether the person is senior citizen (age > 65 years) as on 31st March 2003. Let us assume that the date of birth is entered in cell C3 and the year end date i.e. 31-03-2003 is entered in cell C2. I want to calculate the age. So I enter a formula +C2-C3 in cell C4. To my dismay, I get a number 23755. What does this number represent? It represents the number of days between C2 & C3. It is the age in days but I want the age in years. Can I directly divide the answer by 365? Remember the calculations would be in-exact as there would be leap years as well.

To move further, let us explore three important date functions YEAR (), MONTH () & DAY (). The notations of these functions are self-explanatory and they are used to split a date into its constituent components. For example, YEAR ("17-03-38") will return 1938; MONTH ("17-03-38") will return 3 while DAY ("17-03-38") will return 17. Armed with these newly learned functions, I enter the formula +YEAR (C2)-YEAR (C3) in cell C4. Voila! I get the answer as 65 and am delighted.

Note that the above formula is not fool-proof . Consider the date of birth to be 19th April 1938. While he had still not completed 65 years of age as on 31st March 2003, the above formula treats him as a senior citizen. What was missing? I could make out that in the transitory year, the above formula will not work as the months are not compared at all! Using the IF function, the above formula can be modified as
+IF(MONTH(C2)>MONTH(C3),+YEAR(C2)-YEAR(C3),+YEAR(C2)-YEAR(C3)-1)

In effect, the above formula compares the month component of the date of birth to determine whether the year has completed by the end of the previous year. If it has, it simply calculates the difference in the year components else, it reduces the difference in the year components by 1

In certain cases, one is interested in the difference in months (need not be completed months). To calculate the number of months of delay, one uses the following formula:

+MONTH(C7)-MONTH(C2)+(YEAR(C7)-YEAR(C2))*12

The formula calculates the difference in months components of the dates. It also considers the difference in the years components by taking the same into account and multiplying the same by 12 to convert it into months.

Not too interested in using long and complicated formulae? If you have Analysis Toolpack installed, there is a DATEDIF function which can do the job in a minute. So, to calculate the completed years, I just enter the formula +DATEDIF(C3,C2,"y"). The "y" refers to the completed years. Similarly, +DATEDIF(C2,C7,"m") gives me the completed months of delay which turns up to 13! But in certain cases, one would also like to include partially completed months. In effect, one would like to advance the date to the end of the month. This is where the EOMONTH() function is useful. So I modify my formula to say +DATEDIF(C2,EOMONTH(C7,0),"m"). The answer is 14!

5.3 Numeric Functions

Various built-in functions can be used for manipulating numbers. A complete list of functions is provided in Annexure "B". Such functions can be used for rounding numbers [ROUND(), ROUNDDOWN(), ROUNDUP(), MROUND(), CEILING(), FLOOR()] , counting the cells containing values [COUNT(), COUNTA(), COUNTIF(), COUNTBLANK()] , identifying specific values within the list [MAX(), MIN(), LARGE(), SMALL()] or converting the values into some other format [ROMAN(), TEXT()] . The functions dealing with the totaling of numbers have already been covered in detail earlier.

5.4 Text Functions

Text functions aim at either case conversion [UPPER(), LOWER(), PROPER()] , extraction of part of the text [LEFT(), RIGHT(), MID()], identification and replacement of particular alphabets within a text [FIND(), SEARCH(), REPLACE(), SUBSTITUTE()] or conversion into some other values [VALUE(), DOLLAR()]

5.5 Financial Functions

Function	**Description**
PMT()	Calculates the payment for a loan based on constant payments and a constant interest rate.
PPMT()	Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate.
IPMT()	Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate
NPER()	Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate
RATE()	Returns the interest rate per period of an annuity.
PV()	Returns the present value of an investment. The present value is the total amount that a series of future payments is worth now.
FV()	Returns the future value of an investment based on periodic, constant payments and a constant interest rate

NPV()	
CUMIPMT()	Returns the cumulative interest paid on a loan during a particular period
CUMPRINC()	Returns the cumulative principal paid on a loan during a particular period
FVSCHEDULE()	Returns the future value of an initial principal after applying a series of compound interest rates.
NOMINAL()	Returns the nominal annual interest rate, given the effective rate and the number of compounding periods per year
EFFECT()	Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year
ACCRINT()	Returns the accrued interest for a security that pays periodic interest
PRICE()	Returns the price per $100 face value of a security that pays periodic interest.
YIELD()	Returns the yield on a security that pays periodic interest. Use YIELD to calculate bond yield.
IRR()	Returns the internal rate of return for a series of cash flows represented by the numbers in values. These cash flows do not have to be even, as they would be for an annuity. However, the cash flows must occur at regular intervals, such as monthly or annually.
XIRR()	Returns the internal rate of return for a schedule of cash flows that is not necessarily periodic.

5.6 Some more functions

In addition to the normal functions discussed above, there is a set of financial functions. The same is dealt in a later module. Some more relevant functions are discussed below:

IF()

An IF function is made up of three parts: the condition, the true part, and the false part. Select cell B6, type =IF(B2>10000,B2*D4,B2*E4) , and press Enter. The condition is B2>10000; if true, the program will compute B2*D4, or if false the program will compute B2*E4.

It is possible to replace one part of an IF statement with another IF statement; this is called a nested IF. Select cell B6, edit the formula to read =IF(B2>10000,B2*D4,IF(B8>4,B2*D4,B2*E4)) , and press Enter. This shows that if the value in B2 is not greater than 10000, then a second condition, B8>4, will be considered.

It is also possible to combine conditions using logic functions like AND and OR. Replace the formula in cell B6 with =IF(AND(B2>10000,B8>4),B2*D4,B2*E4). The

function AND shows that both conditions, B2>10000 and B8>4, must be met. Replacing the AND with OR would result in either condition being met, the same accomplishment as the nested IF.

CHOOSE()

The Choose function uses an index value to return a value from the list of values. It can accommodate upto 29 alternative values

ISERROR()

The ISERROR function returns a True if a particular cell contains an error and can be very useful in trapping errors and calculating further values based on the error position

CELL()

The CELL() function can be used to return useful information relating to a particular cell or file.

6 The Look & Feel of Output

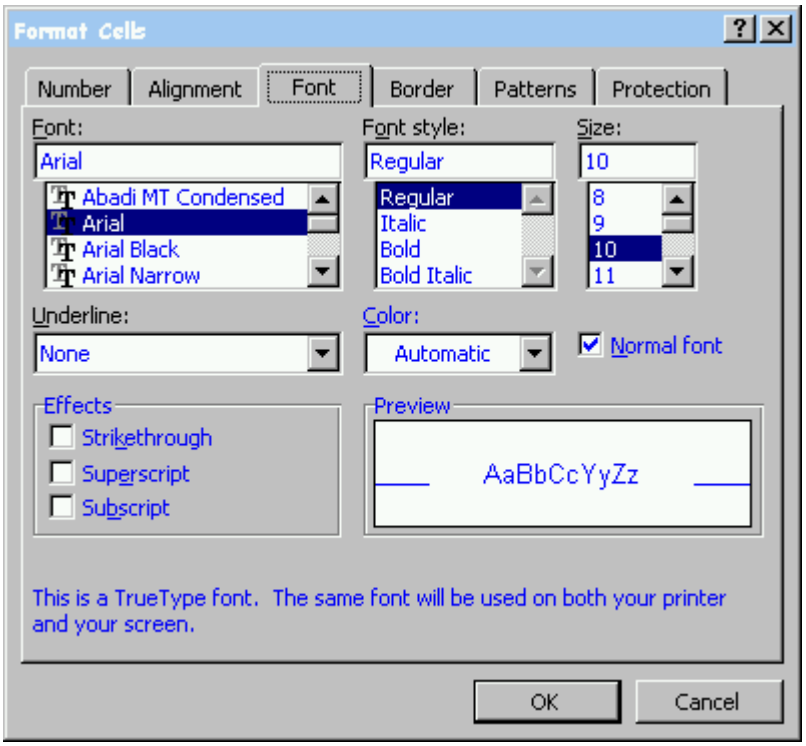
6.1 Formatting

6.1.1 Sheet

It is possible to add a picture to the background of the entire sheet. This should however be done with caution.

6.1.2 Cells (or Range)

Various formatting features can be done on a single cell or a group of cells. To invoke the formatting features, choose the Format Cells Command (Ctrl+1 / Right Click / Format -> Cells). The following screen appears



The various tabs are analysed in the subsequent paragraphs

6.1.3 The Look of Data

This appears in the Numbers Tab The default tab is the Numbers tab. This is the one the user will work with to format the type of number displayed. The options available include: General, Number, Currency, Accounting, Date, Time, Percentage, Fraction, Scientific, Text, Special, and Custom.

6.1.4 Alignment & Text Control

The text can be left aligned, centred or right aligned. It can even be rotated within a cell. Often, a user wishes to have little more control over the text than is allowed within the standard cell borders. Some available options are: Merge Cells which allows more than one cell to be merged into one (accomplished by highlighting the ones the user wishes to merge), Shrink to Fit which will reduce the apparent size of characters within selected cells so that they will fit within the column and Wrap Text which wraps text into multiple lines in a cell.

6.1.5 Fonts, Borders & Patterns

In order for grid lines (or any other formatting) to be present, the user must apply the appropriate options. To apply borders right click on the active cell(s) then choose Format Cells from the menu that appears. From the tabbed Formatting Window, left click on the Borders tab to select it. There are parameter locations for the borders to be applied top, bottom, left, right, etc.), as well as a list of line styles and a drop down menu of color choices. The user can left click on the desired options. Left click the OK button to apply the selections and continue.

6.1.6 Indented Text

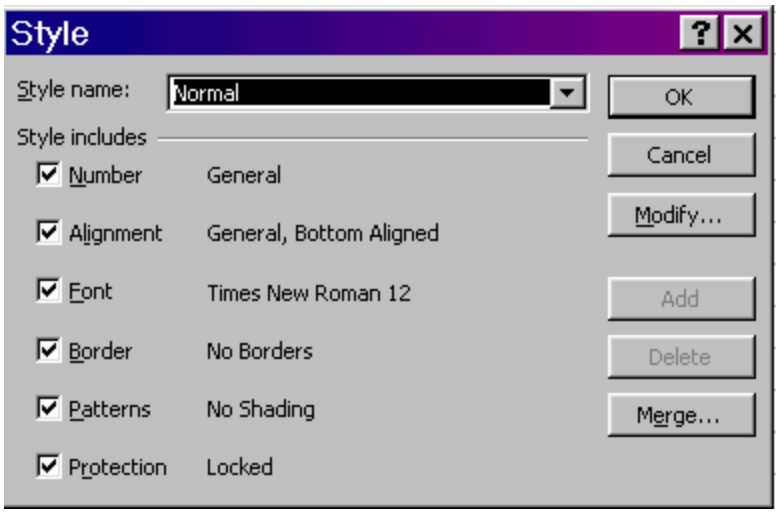
In case one intends to indent the text within a particular cell, one can use the indent icons on the standard toolbar.

6.1.7 Hiding Information

It is possible to hide entire sheets, rows or columns within a particular workbook. To hide a sheet, Choose Format -> Sheet -> Hide. To hide a particular row or column, select the row or column, right click and choose Hide. It is however not possible to hide the contents of individual cells. The work-around solution is to format the cell contents to display the same font color and cell background so that effectively the information gets hidden.

6.2 Styles..

Styles represent standardized sets of formats. To initiate the styles, Choose the same from the Format Menu. The following screen appears



One can choose from the existing styles or create a new one. The new style can be based on an existing style. Since styles are workbook specific, one may need to use the merge button to merge styles from existing workbooks. To create styles which are available across all workbooks, create the same in the Personal.xls workbook

6.3 Conditional Formatting

Conditional formatting permits the user to apply special formatting settings that take effect when the contents of the cell meet specified conditions. For instance, if there is a loss under a particular head, you intend to colour it red so that it immediately catches your attention. Similarly, you may like to colour your balance sheet totals to blue if they do not tally. One very practical tip is to combine the ISERROR function with the Conditional Formatting feature to hide errors. What is effectively done is that the font and the background is set to the same color if the cell contains an error.

- Select the range of cells for which the formatting is desired
- Choose Format -> Conditional Formatting
- Allows different forms of formatting based on the cell contents
- Maximum of 3 different conditions can be specified
- To suppress errors, choose Formula is =ISERROR() and then choose same colour font as the background colour

6.4 Custom Views..

The Custom View feature is available from the View Menu. It ensures that one need not set up the sheet each time one wants to print a particular sheet. The user first sets up the

entire sheet in the way desired for storage (including column & row widths, hidden rows, autofilters, printer settings, etc.) He then initiates the Custom View Feature and allots a descriptive name to the View. Later on, even if the print settings, etc. are altered, the user can go back to the same view by selecting that specific view.

6.5 Printing

Before beginning the actual task of printing, it is necessary to orient the worksheet to the specifics of a printer. This is done through the page setup command. The page setup screen comes up which has four tabs: page (wherein paper size, orientation, compression mode, etc. are specified), margins (to specify the margins on top, bottom, right, left), header/footer (self explanatory) & sheet (which has some useful options – rows to repeat at top, gridlines, etc.). One can also consider the use of Report Manager add-in which permits multiple sheets or print areas to be synchronized as one print job (so as to facilitate continuous page numbering) Additionally a Report Manager can work on alternate views and scenarios within a single synchronised report.

6.6 Saying it with Charts..

It is said that an ounce of image is worth a pound of performance. A chart is a graphic representation of worksheet data. Before understanding the creation of a chart, one needs to be clear of the basic elements of a chart which include the X & Y Axes, X & Y Axis Values, chart title, legend, data markers, tick marks, gridlines, data labels, etc.

To invoke charts Choose Chart from Insert Menu. The Chart Wizard takes you through the rest of the process.

Excel provides for a wide variety of chart types. In case one is interested in depicting the trend in a particular value, one should select a linear chart like Bar, Column, Line, etc. If one is keen on looking at the constitution of various elements into a total, consider Contribution charts like Stacked Charts, Pie, Doughnut, etc. Then there are specialized charts like HLC Chart for analyzing stock trends, radar charts, scatter diagrams, etc.

7 Copying & Moving

One of the most common utilities of any Windows program is the cut/paste and the copy/paste features. Needless to mention, the same are available in MS-EXCEL also. To summarise, select a range of cells (it can be a set of non contiguous cells also), press Ctrl+C to activate the Copy command from the keyboard after selecting the cells. Ctrl+X is the keyboard command to cut the cells. You paste the cells from the keyboard by pressing Ctrl+V. One can copy/move data across cells by using the mouse and the drag-and-drop technique. Simply drag-drop would imply a move, whereas holding the Control key while dragging-dropping will imply a copy.

While copying values across poses no problems, one has to be careful while copying formulae. When a formula containing a cell reference is entered into a cell, Excel keeps track of that formula in two ways: one is relative referencing whereby the relative position of the addressed cell and not the cell position itself is stored in the formula (this is the default and is quite handy most of the times). For example, if A3 contains the formula +A1+A2 and the same is copied to B3, the formula in B3 changes to +B1+B2. While this is mostly beneficial, in some cases, one may want to freeze the cell position referred and may not want the same to be changed in case of subsequent copying of data. For this purpose, one needs to use the absolute referencing. Here, the exact cell position of the addressed cell is stored in the formula. The absolute referencing is identified by the use of the $ sign in the cell address. Thus $A$7 implies that the cell address A7 is absolutely stored in the formula. One may also consider the use of mixed referencing whereby either the row or the column remains constant. To make only the column or row portion of a cell address absolute, press F4 key. Each time you press the F4 key, the $ moves to a different co-ordinate of the cell address. To summarise this issue, when you copy a formula, relative addressing will change the cells that are referenced by the formula. If you need any of the cells to remain constant, make sure that absolute referencing has been added to the original formula before you copy it.

- By default, Excel uses relative referencing.
- To make either the column or the row referencing (or both) absolute, the column or row number has to be preceded by a $ sign
- The user can circle between the various options by using F4 Function key while in the edit mode of the formula

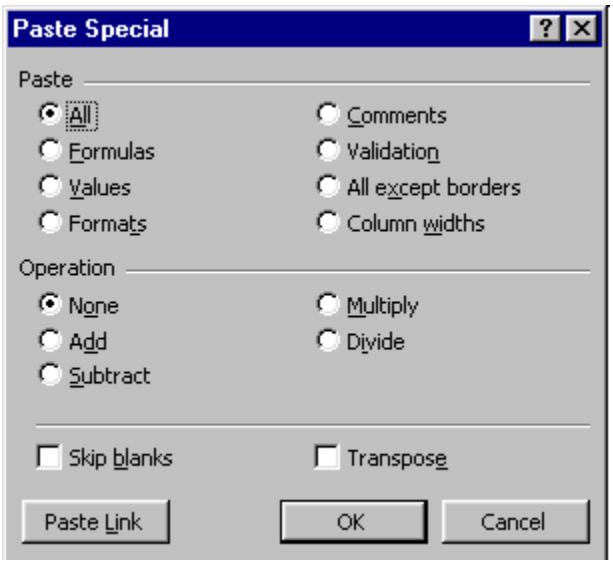
7.1 Paste Special

Instead of copying entire cells, it is possible to copy specified contents from the cells — for example, one can copy the resulting value of a formula without copying the formula itself. To copy only partially a cell, follow these steps:

1. Select the cells you want to copy.
2. Click Copy.
3. Select the upper-left cell of the paste area.
4. On the Edit menu, click Paste Special.
5. Click an option under Paste, and then click OK.

– Various options to paste!

There are various options to paste special. The options are summarized in the screen-shot below:



8 Saving Work & Protecting It

Once the sheet is prepared for data entry purposes which includes data validations, lookups, conditional formatting, etc., one may like to ensure that none of such validations/formulae are accidentally overwritten by the person entering the data. One may therefore look at worksheet protection. To protect a particular sheet, choose Tools -> Protection -> Sheet. One may provide a password if required. Similarly, to protect the entire workbook, one chooses Tools -> Protection – Workbook. Once a sheet/book is protected, no alterations are permitted in the sheet/workbook.

Many a times, the need may be to protect the sheet but at the same time permit data entry in particular cells. To achieve such a dual purpose, one first unlocks the cells wherein the data entry is to be permitted (Choose Format -> Cells -> Protection) and then follows up the same with the sheet/workbook protection as outlined above. In such a scenario, entry is permitted only into unlocked cells.

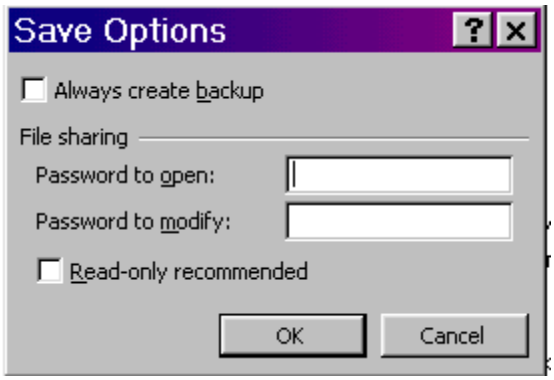
Worksheet protection still permits the viewing of the formulae. In many cases, the user may not want the other person to know the formula. In that case, the cell formula can be hidden (Choose Format -> Cells -> Protection). The contents of the cell are of course displayed. It should be noted that hiding a cell has no effect unless the worksheet is itself protected.

Protecting cells helps prevent accidental corruption of a spreadsheet. To protect cells:

1. All cells in a spreadsheet are automatically "locked" when the spreadsheet is created. But this is inconsequential unless the sheet is protected.
2. Unlock only cells you may want to edit. To unlock a cell, select the cell, click the right mouse button, select Format Cell (or choose Format/Cells), select the Protection tab in the box that appears, click on the locked box to remove the check that is there, this unlocks the cell.
3. To protect the spreadsheet, select Tools/Protection/Protect Sheet. In the dialog box that appears, click OK. You may also apply a password but if you forget it you cannot unprotect the sheet!
4. Once the sheet is protected, only unlocked cells can be edited.

8.1 File-Level Protection

One can password-protect the entire file. To do this, after creating the document, Choose "Save As" from the File Menu. Select the general options from the Tools Tab and the following screen appears:



In the file sharing options, specify the passwords. You can specify two types of passwords, one authorising the user to open the file, another permitting him to modify the same. In case you would just like to warn the user about the importance of the file without introducing the hassles of passwords, you can select the “read-only recommended” option.

9 Analysing Data

9.1 Data Tables

One may also consider the use of MS-EXCEL to perform what is commonly known as a what-if analysis. What if analysis examines how sensitively a situation will react to changes in factors that influence the situation. Let us take the example of a person availing of a housing loan. The EMI payable would depend both on the interest rate and the period of repayment (assuming that the loan amount is ascertained). Let us calculate the EMI for a housing loan of Rs. 7.5 lakhs taken @ 11% per annum for a period of 15 years. I enter each of these basic data in separate cells A1 = 750000, A2 = 11%, A3 = 15
I enter the formula for calculation of EMI in Cell A4 as =PMT(A2/12,A3*12,-A1) {Note that the EMI calculations in Excel are denominated in months and also that reverse cash flows are indicated by negative numbers}. Now the person might be interested in knowing the effect on the EMI for each change of 0.25% in the interest rate. Such a sensitivity is known as what-if analysis. In Excel, what-if analysis is performed through the use of data tables. A data table is a range of cells that shows the results of substituting different values in one or more formulas. The Data Table command performs calculations using a series of different input values and hence is an efficient alternative to creating formulas in individual cells and editing or copying the formula when a value changes. To initiate the process, choose the Table Command from the Data Menu.

A data-table can be either a one-variable table or a two variable table. In a one-variable data table, the alternative values are entered as row labels and the resulting formulae are specified as column labels. As such, it is possible to specify multiple formulae. Such a table is known as column oriented data table. In case of a two variable table, the resulting formula is entered at the intersection of the row and column labels (each of which contains alternative values). As such, in case of two variable data table, one can specify just one formula.

- Useful for what-if analysis
- Type the formulae in the columns & possible range of values in the rows
- Select the range and Choose Data -> Table
- Select the variable cell as the column input
- For two variable data table, specify formula at the intersection of the row and column

9.2 Scenarios

The limitations of the data tables feature are but obvious! Time to introduce the Scenarios feature. This feature enables you to analyse your data to see how changing one or more values in a worksheet affects the other cells in the worksheet. Effectively using this feature is a two step process: one is to create a scenario and the other step is to view the results as a summary. The entire process is simple and self explanatory

- What-if analysis on multiple criteria (pre-defined situations)
- Choose Tools -> Scenario

1. Define a Scenario by "ADD"
2. Alter a Scenario by "DELETE" / "EDIT"
3. Concept of Changing Cells & Resultant Cells

- View Results
- Scenario Summaries

9.3 Goal Seek

Goal Seek is another useful feature which can be used to achieve a certain value in a cell that contains a formula. The way this is done is to adjust the value of another cell that has a direct effect on the original cell. After all, the valuation of closing stock has a direct effect on the net profit!

- Concept of working reverse way
- Select Tools -> Goal Seek

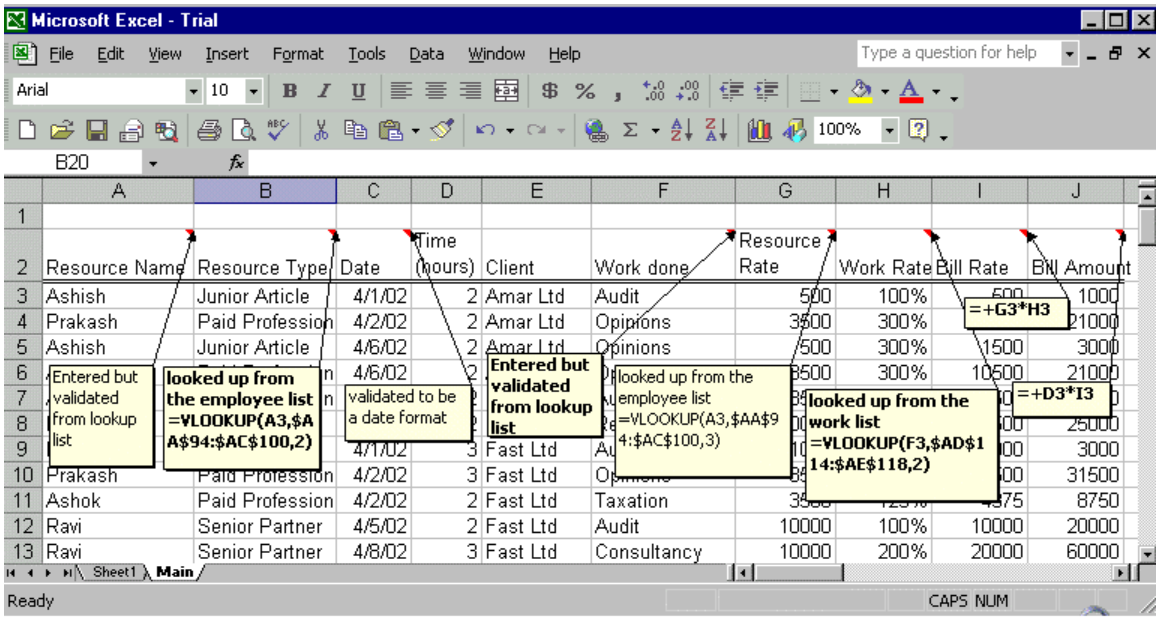
9.4 Solver

Again, Goal Seek is an elementary function which may at times supply absurd results. For example, it may let stocks be over-drawn. For a more sophisticated approach, choose the Solver Add-in (cozily sitting on the Tools menu) which not only allows you to specify constraints (so that stocks don't get overdrawn or sales don't exceed the production capacity) but also permits multiple varying cells. The reports generated by the add-in can help solve simple problems in linear programming.

- Select Tools -> Solver
- Concept of Target Cells, Changing Cells & Constraints
- Utility of Answer Reports & Sensitivity Reports
- Saving the solution as a scenario

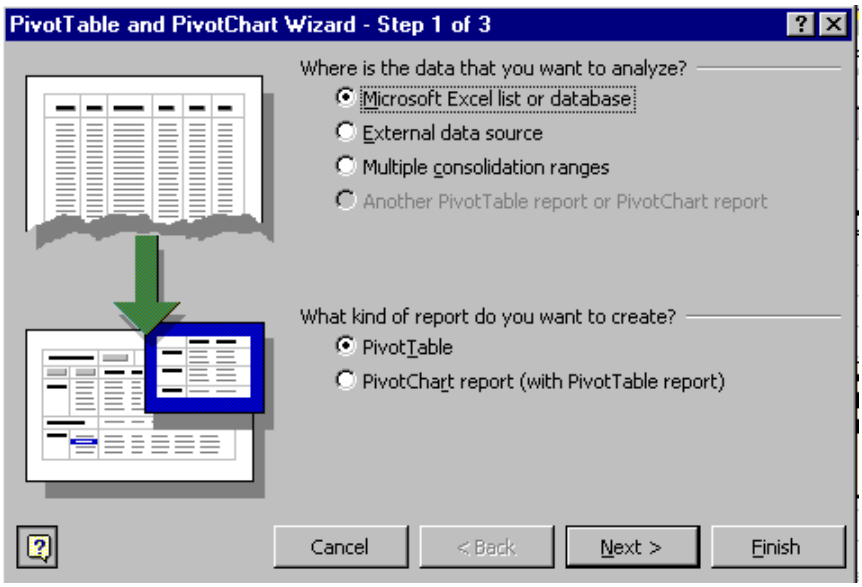
10 PivotTables

PivotTable is a very powerful analysis tool built into MS-EXCEL. It helps in analyzing & summarizing large collections of data. Such data can be derived from various sources. The most common choice is to however create a pivot table from an Excel list. For the purpose of understanding, the following Excel list consisting of time sheet records of a professional firm is analysed using PivotTables

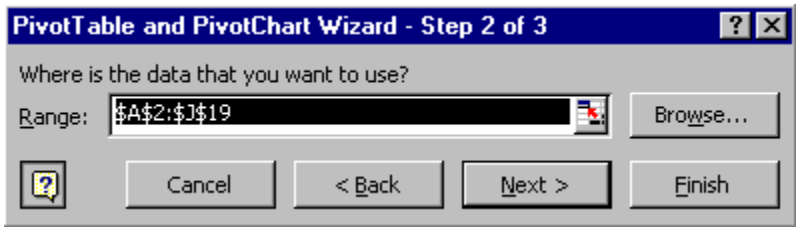

Microsoft Excel - Trial
File Edit View Insert Format Tools Data Window Help
Type a question for help
Arial 10
100%
B20
Resource Name
Resource Type
Date
Time (hours)
Client
Work done
Resource Rate
Work Rate
Bill Rate
Bill Amount
Ashish Junior Article 4/1/02 2 Amar Ltd Audit 500 100% 500 1000
Prakash Paid Profession 4/2/02 2 Amar Ltd Opinions 3500 300% 10500 21000
Ashish Junior Article 4/6/02 2 Amar Ltd Opinions 500 300% 1500 3000
4/6/02 3500 300% 10500 21000
4/7/02 3 Fast Ltd 1000 25000
Prakash 4/2/02 3 Fast Ltd 1000 3000
Ashok Paid Profession 4/2/02 2 Fast Ltd Taxation 4375 8750
Ravi Senior Partner 4/5/02 2 Fast Ltd Audit 10000 100% 10000 20000
Ravi Senior Partner 4/8/02 3 Fast Ltd Consultancy 10000 200% 20000 60000
Entered but validated from lookup list
looked up from the employee list =VLOOKUP(A3,$AA$94:$AC$100,2)
validated to be a date format
Entered but validated from lookup list
looked up from the employee list =VLOOKUP(A3,$AA$94:$AC$100,3)
looked up from the work list =VLOOKUP(F3,$AD$114:$AE$118,2)
=+G3*H3
=+D3*I3
Sheet1 Main
Ready
CAPS NUM

10.1 Creating a Pivot Table

For creating a PivotTable, choose the PivotTable command from the Data menu. The PivotTable wizard appears and takes you through the process of creating a PivotTable


PivotTable and PivotChart Wizard - Step 1 of 3
Where is the data that you want to analyze?
Microsoft Excel list or database
External data source
Multiple consolidation ranges
Another PivotTable report or PivotChart report
What kind of report do you want to create?
PivotTable
PivotChart report (with PivotTable report)
Cancel
< Back
Next >
Finish

Step1 Specify the Data Source: Here we specify either an existing Excel list or an external source of data. We also specify whether we want to create a PivotTable or a PivotChart report. The default choices are generally Excel list and PivotTable. Choose Next to specify the data range.

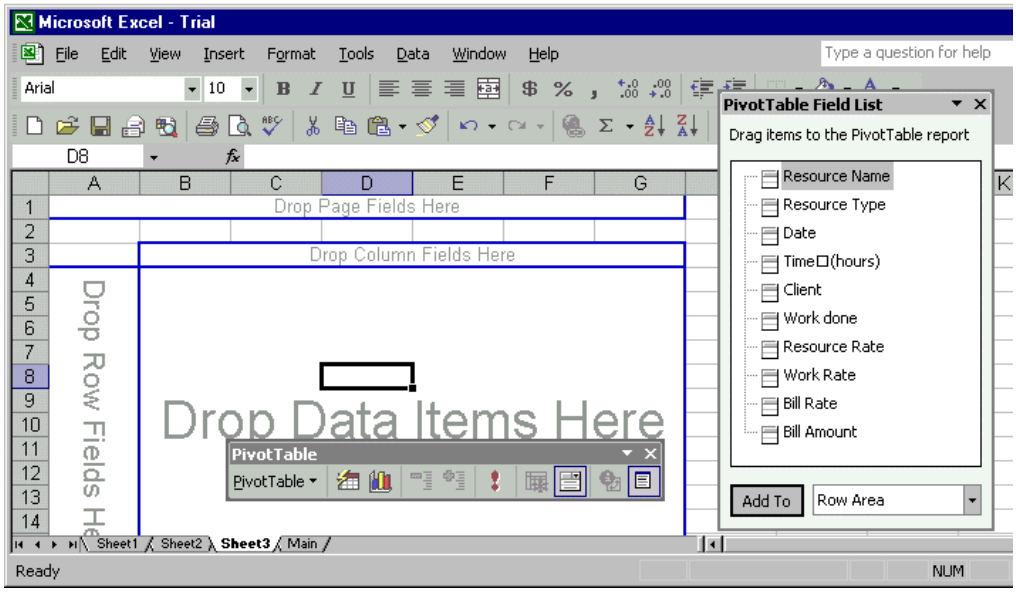


Step 2 Define the Data Range: Ensure that the correct range of cells has been included. Click the next button to specify the location of the PivotTable

Step 3 Choose the location of the PivotTable. Select New worksheet and click Finish

10.2 Layout of the PivotTable

At this stage, it is necessary to understand certain terms relevant for the purposes of PivotTables. For effective analysis, PivotTable uses the concepts of row & column fields for summarizing and grouping data. The page field could be used to filter out the data on a particular item. The data field contains the summary information. To create the analysis, drag the desired item from the PivotTable Field list and drop it in the relevant section of the main table.



10.3 Some Examples:

	A	B
1	Drop Page Fields Here	
2		
3	Sum of Bill Amount	
4	Client	Total
5	Amar Ltd	46000
6	Back Ltd	32000
7	Fast Ltd	123250
8	Packing Ltd	70625
9	Sun Ltd	60000
10	Grand Total	331875

To obtain a report containing the gross amounts billed for a particular client, drag the client field as row field and "Bill Amount" field as the data field. The report is ready!

On analyzing the report, I find that the firm earns maximum revenues from Fast Limited.

Similarly, I could analyse the gross revenues earned by a particular employee (remove the client field by dragging it back to the pivottable field list and drag the "resource name" field list to the row field area) or also get a report of segment-wise revenue (drag the "work done" field to the row field area).

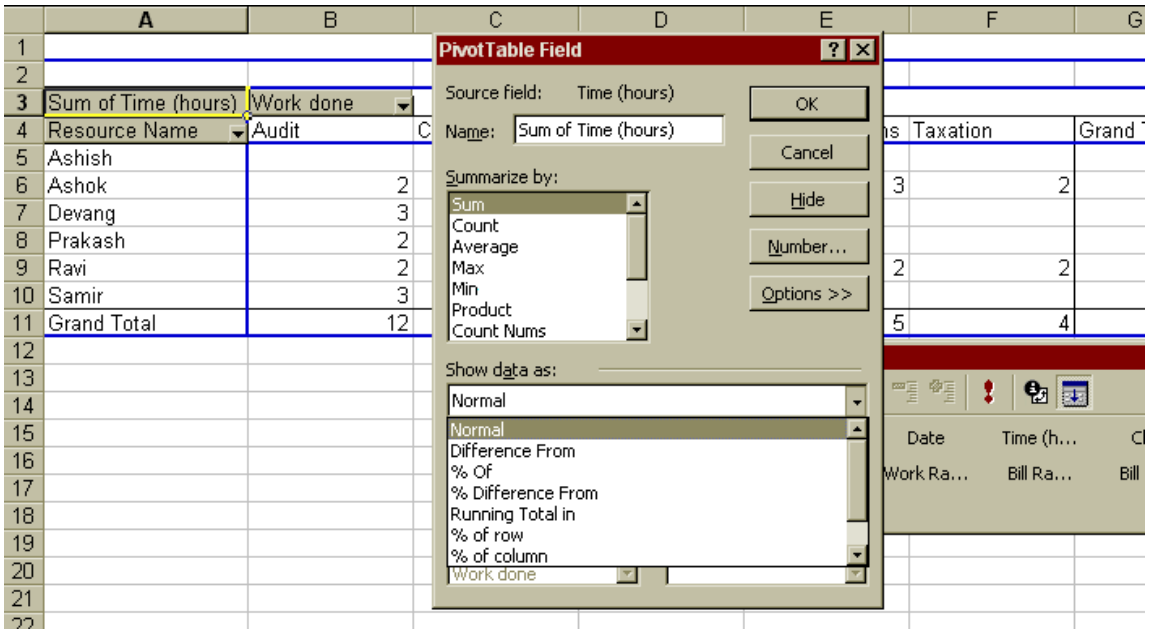
It is also possible to drill down to the details of the above report by clicking on a particular client and choosing the field on which detail is required (say resource name) Further levels of data can be selected by clicking successive items. Similarly, it is also possible to expand or collapse the levels of data displayed either by double-clicking or by choosing the relevant command from the PivotTable Toolbar. To view the complete details of a particular summarized amount, click on that amount to create a new sheet which displays only the records that were included in that summarized amount.

Sum of Bill Amount			
Client	Resource Name	Date	Total
Amar Ltd	Ashish	4/1/02	1000
		4/6/02	3000
	Ashish Total		4000
	Ashok	4/6/02	21000
	Ashok Total		21000
	Prakash	4/2/02	21000
	Prakash Total		21000
Amar Ltd Total			46000
Back Ltd			32000
Fast Ltd			123250
Packing Ltd			70625
Sun Ltd			60000
Grand Total			331875

Now suppose I want a cross dimensional analysis of data in terms of client-wise revenue as well as segment-wise revenue. I position the client as row field and "work done" as the column field. The data item of course continues to be gross amount. The resultant report looks as under:

	A	B	C	D	E	F	G
3	Sum of Bill Amount	Work done					
4	Client	Audit	Consultancy	Opinions	Representations	Taxation	Grand Total
5	Amar Ltd	1000		45000			46000
6	Back Ltd	7000			25000		32000
7	Fast Ltd	23000	60000	31500		8750	123250
8	Packing Ltd	3000	2000	52500	13125		70625
9	Sun Ltd		35000			25000	60000
10	Grand Total	34000	97000	129000	38125	33750	331875

Now I divert my attention from the revenues generated to the time spent. I choose "resource name" as the row field, "work done" as the column field and "time hours" as the data field. I double click on the data field in the pivottable. A new screen pops up to provide various options for displaying the data



The first list in the said screen (Summarize by) provides for alternative ways of summarizing information. While the default is the sum of the data item, it is also possible to choose either the average, maximum, minimum, number of occurrences, etc.

The second list in the said screen (Show data as) allows different methods of displaying the summary data. I choose "% of row" and click OK to change the format of the chart. The resulting chart helps me analyse the work specialities of specific employees.

Sum of Time (hours)	Work done					
Resource Name	Audit	Consultancy	Opinions	Representations	Taxation	Grand Total
Ashish	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%
Ashok	10.53%	26.32%	36.84%	15.79%	10.53%	100.00%
Devang	75.00%	25.00%	0.00%	0.00%	0.00%	100.00%
Prakash	28.57%	0.00%	71.43%	0.00%	0.00%	100.00%
Ravi	22.22%	33.33%	0.00%	22.22%	22.22%	100.00%
Samir	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Grand Total	27.27%	20.45%	31.82%	11.36%	9.09%	100.00%

Similarly, if I choose "% of column" Format for displaying data, I can analyse whether the organization is dependent on a particular employee for a particular segment of work.

Sum of Time (hours)	Work done					
Resource Name	Audit	Consultancy	Opinions	Representations	Taxation	Grand Total
Ashish	0.00%	0.00%	14.29%	0.00%	0.00%	4.55%
Ashok	16.67%	55.56%	50.00%	60.00%	50.00%	43.18%
Devang	25.00%	11.11%	0.00%	0.00%	0.00%	9.09%
Prakash	16.67%	0.00%	35.71%	0.00%	0.00%	15.91%
Ravi	16.67%	33.33%	0.00%	40.00%	50.00%	20.45%
Samir	25.00%	0.00%	0.00%	0.00%	0.00%	6.82%
Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

I could now replace the "work done" column field for the "client" column field and go ahead to analyse the client-employee affiliations if any.

3	Sum of Time (hours)	Client					
4	Resource Name	Amar Ltd	Back Ltd	Fast Ltd	Packing Ltd	Sun Ltd	Grand Total
5	Ashish	25.00%	0.00%	0.00%	0.00%	0.00%	4.55%
6	Ashok	25.00%	50.00%	15.38%	66.67%	71.43%	43.18%
7	Devang	0.00%	0.00%	23.08%	8.33%	0.00%	9.09%
8	Prakash	50.00%	0.00%	23.08%	0.00%	0.00%	15.91%
9	Ravi	0.00%	50.00%	38.46%	0.00%	28.57%	20.45%
10	Samir	0.00%	0.00%	0.00%	25.00%	0.00%	6.82%
11	Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The possibilities are endless and the reports are displayed at the flash of a moment. The only requirement for an effective analysis therefore is the quality of the data list maintained.

11 Auditing Tools

11.1 Auditing Toolbar

Auditing is a means of finding errors and tracing the logic of a complex spreadsheet.

1. Select the cell you wish to audit.
2. Select Tools/Auditing
    a. Trace Precedents shows what goes into the cells calculation
    b. Trace Dependents shows where the audited cell is used
    c. Trace Errors shows where an error statement arises
    d. Remove all arrows removes the arrows when you are finished.
    e. Show Auditing Toolbar is useful if you have a lot of auditing to do

The auditing tools can help in detecting problems in worksheet formulae. Excel supplies an Auditing Toolbar which helps in finding errors on the worksheet. Using an auditing toolbar can also help one to understand the relationships amongst cell references, formulas and data. While the Auditing Toolbar is a great help, of complementary nature is the Goto Special Command. One activates the Goto Special Command by checking the Special Tab on the Goto Command appearing on the Edit Menu. The following screen appears:

11.2 Documenting a Sheet

Many a times, we wish to document a worksheet so that the same can be analysed for logical errors if any. Also, one may want to keep a permanent record for the subsequent user and hence documenting a sheet will help the cause of auditing as well. In this regards, there is a very powerful add-in available at www.spreadsheetinnovations.com

The add-in is known as “Spreadsheet Professional”. The Add-In has to be downloaded from the web-site mentioned above. The program is available in two versions. A demo version is available which works with sheets upto 100 rows only. A full fledged version is available for purchase. The users may try out the demo version before deciding to purchase the product. Having downloaded the software, the add-in has to be loaded in MS-EXCEL. Just Click Tools Menu -> Add-ins-> Browse in MS-EXCEL. Choose the directory where the software is downloaded and the add-in by the name “SPRDprof” gets installed. On installation, the Spreadsheet Toolbar appears below the existing toolbars. there are various options available under the add-in. Under the Build option, there is an important option that enables the translation bar to appear at the bottom of the sheet. In this bar, one can view the translation of the formula in the active cell. Therefore, one can check his logic as he keeps typing in the formulae. Also, another option of spreadsheet painter attempts at dividing the cells into headings, input values, formulae, etc. and uses a separate color for filing the background for each category of cells.

Similarly, there is a spreadsheet formula tracer which gives a graphical presentation of the formulae and permits click and expand facility to correlate the output cells with the input cells. One just needs to try this out to understand the formulae on the sheet.

Similarly, one can test the formulae using the “Test” option from the Toolbar. If a workbook contains two or more worksheets which are more or less similar, the differences can be viewed from the option available in the Use Menu. All these results can be summarized in a workbook by choosing the documentation option. The resultant workbook contains the following worksheets:

1. Summary Sheet which includes the details about the file and the number and name of the sheets within that file
2. Range Names and external links includes all the named ranges with the references to the cell addresses of the ranges to which they refer. Also, a list of external links to other workbooks
3. A map for each worksheet which includes a reference to whether the cell contains a text (L), numeric value (N), formula or function (F) or a lookup (^)
4. A formula translation sheet for each worksheet which attempts to translate the formula step-wise into text entries associated with the formulae.
5. A blank input form for each worksheet containing a summary of all the cells wherein some value has been entered
6. A completed form for each worksheet which contains the summary of all the cells including their current values
7. A list of potential errors within each worksheet. The potential errors are grouped into different categories like Unused Input Value (meaning the value has not been referenced elsewhere even though it should have been), Unused Calculation (the result of a formula has not been referenced elsewhere even though it should have been), references to blank cells (!), forward column references (denotes poor worksheet building), unprotected calculations(someone else may over-write the formula built with a lot of care), etc.

The use of this tool makes us aware of the basic spreadsheet building skills and potential error situations which could be taken care of. Also, one can consider detailed auditing of the formulae through this tool.

11.3 Migrating Data from Other Software

Many a times, we are constrained by the reports generated by the accounting software and would love to have detailed analysis of the data. In such a case, we may consider applying some of the above features to the accounting data so that we could perform our audit in a more meaningful fashion. One can look at this proposition from two perspectives. If the accounting software is ODBC compliant (it means that the accounting software permits its database for reading by other software), one can set up an EXCEL sheet which is linked with the Accounting Software and can generate real time reports. How to do this? Invoke the query by selecting Data -> Get External Data -> New Database Query. The Query Wizard takes you through the rest of the steps. The advantage of linking data in this fashion is that you can refresh the data at the click of a mouse (you may even automate this!)

Of course, many accounting software may not be ODBC compliant. In that scenario, one may need to explore the options available in the package for exporting data. Most recent packages permit an export into MS-EXCEL. In that case, the dinner is ready for you! But if the package does not permit an Excel export but permits a text export (which all packages provide for), then one may need to import that text file into MS-EXCEL by selecting the Import Text File Option.

11.4 Common Audit Techniques

Having imported the accounting data in MS-EXCEL, it is upto the imagination of the auditor to use his creativity in quickly analyzing records through the features provided in MS-EXCEL. For example, to search duplicate records and identify gaps, one can adopt the following procedure

1. Convert the tested field (say invoice number) to numeric
2. Sort the records based on the tested field
3. Find the difference between the first and the second record in the tested field in an adjoining column (which should ideally be 1)
4. Copy down the formula throughout the record range
5. AutoFilter the records for finding values which do not evaluate to 1 (0 will imply a duplicate record, a value more than 1 will imply a gap)

Similarly, in case of a single product entry, one can consider the extent to which discount is permitted by using the Data Analysis Toolpak to find the correlation between quantity and the billed amounts.

One can also draw random samples from the population by using the Sampling Tool. Also consider the need for stratification of data through AutoFilter

12 Automating MS-EXCEL

12.1 Open EXCEL each time computer starts

Most of the finance executives heavily use MS-EXCEL. If the computer has limited hardware resources and a lot of add-ins, MS-EXCEL may take time to load itself. In such cases, one may venture into loading MS-EXCEL every time Windows is started. One achieves this by placing a shortcut to MS-EXCEL program in the Startup Folder of the Program Menu. (In fact, one can load any program by placing it in the Startup Folder)

12.2 Open a particular file each time EXCEL starts

There may also be a need to load a particular EXCEL file (or may be files) every time MS-EXCEL is started. This can be done by placing a shortcut of that file in the XLStart Folder.

12.3 Create a new file based on a template each time computer starts

One may also consider the use of workbook template in case each file is expected to follow some common pattern. The file should be saved as a template (xlt). To use the template as the default for all new workbooks, save the template in the XLStart Folder.

To create a default sheet template, create a single sheet file as a template and save the same in the XLStart Folder (The file should be named as Sheet.xlt)

Any macro by the name Auto_Open() runs automatically (subject to the security settings) each time the workbook is loaded. Similarly, a macro by the name Auto_Close() runs automatically each time the workbook is closed.

12.4 Specifying the Defaults in EXCEL

One can configure the appearance of the menu and the toolbars by choosing Tools – Customise and dragging and dropping the relevant icons/commands. One can also set up certain defaults including the default folder for saving files, default font, etc. by choosing Tools-> Options. One useful option is to set Precision to displayed (Accordingly, the printout will not contain apparent errors (For example, if the format is set to display 0 decimals and two cells contain values 3.4 and 2.4 and the third cell contains the total of these two formulae, normally it would be displayed as 3, 2 & 6 (as total is 5.8). Now this does not appear correct on reading. If Precision is set to “as displayed” one sees 3, 2 & 5.

12.5 Customizing Menus & Toolbars..

Excel offers several toolbars to save you time in choosing commands. The Standard and the Formatting Toolbar appear at the top of the screen. Certain other toolbars also appear depending on the command that is being executed.

To show or hide a toolbar, choose View, Toolbars. On the Toolbar Menu, a check mark appears next to the toolbar that is displayed. To show or hide a toolbar, click a toolbar name in the menu. Excel displays or hides the toolbar in the Excel window.

Once a toolbar is displayed, one can position it in a place most convenient. Toolbars can be placed at any place of the display screen by the simple drag-and-drop technique.

It is also possible to dock a particular toolbar at any of the extreme positions of the screen. However, if the toolbar contains a drop-down list, it is not advisable to dock it to the left or right extremes.

12.5.1 Adding new toolbar

One can create a custom toolbar that provides all the options needed to perform tasks in Excel with ease. To create a custom toolbar, follow the steps outlined below:

1. Choose View, Toolbars, Customise
2. Click the Toolbars Tab
3. Click the New Button
4. In the Toolbar Name Box, give a descriptive name to the toolbar
5. Click OK
6. Click the Commands Tab
7. From the commands that appear, drag the required commands to the customized toolbar
8. When done, click the Close button to close the Customise Window.

12.5.2 Adding new menu

One can even create a custom menu item that provides all the options needed to perform tasks in Excel with equal ease. To create a custom menu, follow the steps outlined below:

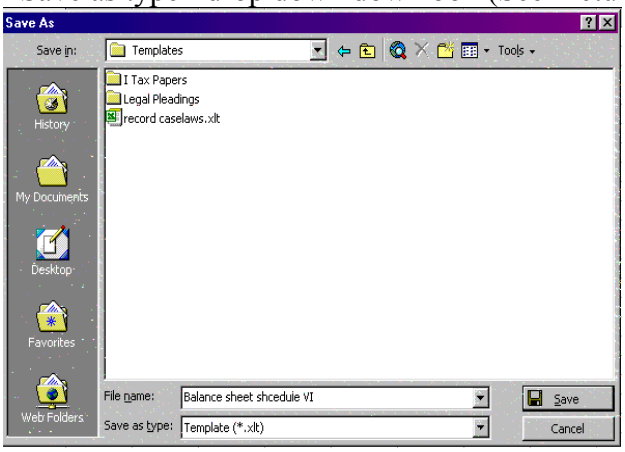
1. Choose View, Toolbars, Customise
2. Click the Command Tab
3. Click the New Menu Option and drag and drop to the main menu bar.
4. Right Click the dropped menu and give a descriptive name to the menu
5. Click OK
6. Click the Commands Tab
7. From the commands that appear, drag the required commands to the customized menu
8. When done, click the Close button to close the Customise Window.

12.6 Customization Options

In the customized menu options, there are a few important commands. The most important is the command which disables the recently used commands. Also one may consider disabling the preview of the fonts in the font list.

12.7 Templates

A template is a workbook that you create and then use it as the basis for other similar workbooks. For e.g.- Format of a Schedule VI Balance sheet. You can create a complete format of a Schedule VI Balance Sheet (without typing out the Company Name and amounts, of course!) and save it as a template. To save it as a template, Click <File> → <Save As..>. In the [Save As] dialogue box that appears, select (Template *.xlt) in the <Save as type> drop down down box (See Picture).



By default, the template is saved in the folder C:\windows\Application Data\Microsoft\Templates. If you wish to see a preview of the first page of your template in the preview box when you click <File> → <New>, click <File> → <Properties> and in the <Summary> tab check out the <Save preview picture> checkbox. The next time you wish to prepare a Balance Sheet in Schedule VI format just click on <File> → <New> and select this template. A fresh blank format of schedule VI Balance sheet is ready in front of you. Just go ahead and fill the Company name, amounts, etc. and you are ready for a print out. This feature can be used to prepare bills, vouchers, forms, etc.

Default File Template

Every time you start MS Excel, a blank workbook opens by itself. This workbook can be customised in terms of formatting, repeated text, data, graphics and formulas and custom buttons and toolbar settings. The formatting customisation includes 1. Cell and sheet formats you set by using the commands on the Format menu. 2. Page formats and print area settings for each sheet. 3. Cell styles. 4. The number and type of sheets in a workbook. 5. Protected and hidden areas of the workbook; for example, you can hide sheets, rows, and columns and prevent changes to worksheet cells. To customise the default workbook, format a new workbook the way you want in terms of the above mentioned parameters and save it as a template by the name book.xlt in the folder C:\Application Data\Microsoft\Excel\XLStart. Now what will happen is that every time

you start Excel, Excel will look for the workbook template book.xlt in the folder XLStart and will open a fresh workbook based on this template. Thus all new workbooks that you create will be formatted based on the settings that you have specified in the template book.xlt.

Sheet Template

Whenever you insert a new worksheet in any workbook, you may require it to have some customised formatting and other settings. To do this, open a fresh workbook. Keep only one worksheet in it by deleting all other worksheets. Format this worksheet the way you wish all new worksheet be formatted. Now save this workbook as a template by the name sheet.xlt in the folder C:\Application Data\Microsoft\Excel\XLStart. Now, all new worksheets that you insert in any of the workbooks will be formatted based on the settings that you have specified in the template sheet.xlt.

12.8 Workspaces..

One can open a group of workbooks in a single step by creating a workspace file. A workspace file saves information about all open workbooks, such as their locations, window sizes, and screen positions. When you open a workspace file by using the Open command (File menu), Microsoft Excel opens each workbook saved in the workspace. The workspace file does not contain the workbooks themselves, and you must continue to save changes you make to the individual workbooks.

1. Open the workbooks you want to open as a group.
2. Size and position the workbook windows as you want them to appear the next time you use the workbooks.
3. On the File menu, click Save Workspace.
4. In the File name box, enter a name for the workspace file.

12.9 Talking with Other Software

In case a hyperlink is inserted into a specific file, the contents of the file are not copied but only the reference thereto is copied. In such a situation, there are no concerns of static data. However, both the files have to be transported as a package.

OLE (Object linking and embedding) makes another file a part of the first file and hence there may not be a need to transport the original file along with the other file. Linked objects are updated whereas embedded objects are static.

13 Introduction to Macros

If you perform a task repeatedly in Microsoft Excel, you can automate the task with a macro. A macro is a series of commands and functions that are stored in a Visual Basic module and can be run whenever you need to perform the task. When you record a macro, Excel stores information about each step you take as you perform a series of commands. You then run the macro to repeat, or "play back," the commands.

Macros are very useful but potentially dangerous as they can contain viruses. Viruses are programs that are written by individuals, usually with the intent to destroy or corrupt data. When you open an affected workbook or perform an action that triggers a macro virus, the virus can become active, be transmitted to your computer, and be stored in Personal.xls, a hidden workbook, or some other undetectable location. From that point on, every workbook you save can be "infected" automatically with the virus. If other people open infected workbooks, the virus can be transmitted to their computers as well.

Microsoft Excel offers three levels of security to reduce macro virus infections. The three security levels are:

- High You can run only macros that have been digitally signed and that you confirm are from a trusted source. Before trusting a source, confirm that the source is responsible and uses a virus scanner before signing macros. Unsigned macros are automatically disabled and the workbook opens automatically.

- Medium Excel displays a warning whenever it encounters a macro from a source that is not on your list of trusted sources. You can choose whether to enable or disable the macros when you open the workbook. If the workbook might contain a virus, you should choose to disable macros.

- Low If you are sure that all of the workbooks and add-in programs that you open are safe, you can select this security level, which turns off macro virus protection. At this level, macros are always enabled when you open workbooks.

If you set the security level to Medium or High, you can maintain a list of trusted macro sources. When you open a workbook or load an add-in that contains macros developed by any of these sources, the macros are automatically enabled.

One can customise the security level through the following steps

1. On the Tools menu, point to Macro, and then click Security.
2. Click the Security Level tab.
3. Click Low.

13.1 Global Macros vs. Individual Macros

If you want a macro to be available whenever you use Excel, store the macro in the Personal Macro Workbook in the Excel Startup folder. In such a case, the macro is

available for use across all workbooks. If the macro is desired to be used in an individual workbook, save the macro in that workbook.

13.2 Use of Macro Recorder

One can use the Macro Recorder to create macros by intuition. The Macro Recorder records the Visual Basic command equivalents as the commands are being executed in the fore-front. To record a macro using a recorder, follow the following steps:

1. On the Tools menu, point to Macro, and then click Record New Macro.
2. In the Macro name box, enter a name for the macro.
3. To run the macro by pressing a keyboard shortcut key, enter a letter in the Shortcut key box
4. In the Store macro in box, click the location where you want to store the macro.
5. Click OK.
6. If you select cells while running a macro, the macro will select the same cells regardless of which cell is first selected because it records absolute cell references. If you want a macro to select cells considering the position of the active cell when you run the macro, set the macro recorder to record relative cell references.
7. Carry out the actions you want to record.
8. On the Stop Recording toolbar, click Stop Recording

13.3 Running Macros

After you record a macro, you will usually run it in Microsoft Excel. To interrupt the macro before it completes the actions you recorded, press ESC. There are numerous ways in which a macro can be run.

<u>From VB Environment</u>

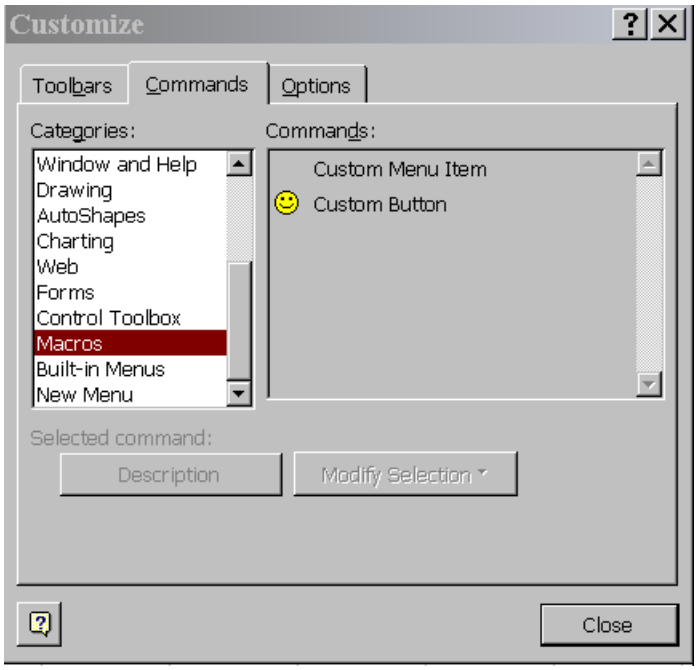
1. On the Tools menu, point to Macro, and then click Macros
2. In the Macro name box, enter the name of the macro you want to run.
3. Click Run

<u>Through a Shortcut key</u>

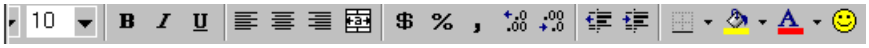
1. On the Tools menu, point to Macro, and then click Macros.
2. In the Macro name box, enter the name of the macro you want to assign to a keyboard shortcut
3. Click Options.
4. Enter a letter in the Shortcut key box
5. Click OK.
6. To run the macro, press Ctrl and the Shortcut Key

<u>From the Toolbar</u>

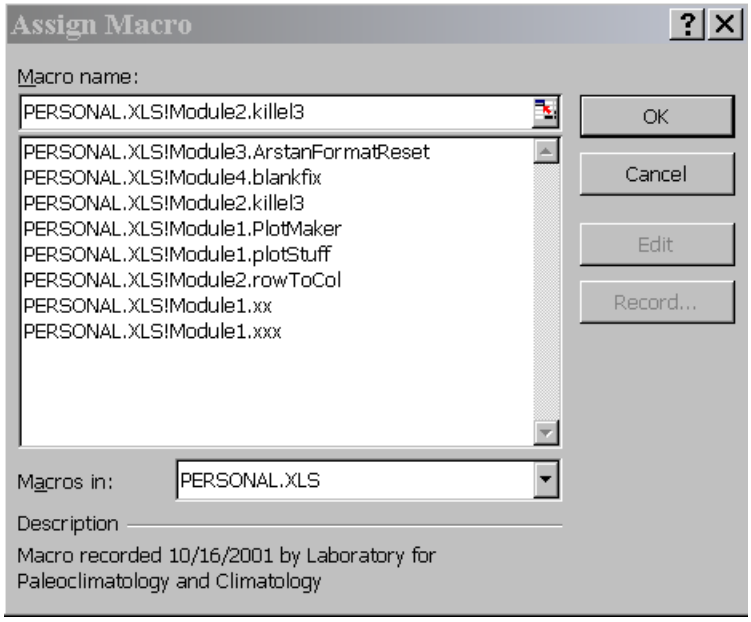
1. On the Tools menu, click Customize.



2. Click the Commands tab, and then click Macros in the Categories list. In the Commands list, drag the Custom button onto a toolbar. A button has now been added to the toolbar.



3. Right-click the toolbar button, and then click Assign Macro on the shortcut menu.



4. In the Macro name box, enter the name of the macro. Now you have assigned a macro to the Custom button. Run the macro by clicking on the Custom button.

5. If required, customize the button image. The name and image of the button can be customized by right clicking on your mouse and selecting the “edit” button option.

13.4 Basics of VB Programming

13.4.1 Objects

An object represents an element of an application, such as a worksheet, a cell, a chart, a form, or a report. In Visual Basic code, you must identify an object before you can apply one of the object’s methods or change the value of one of its properties. Objects are collection of data or cells, etc on which some operation can be performed. There are various object collections available in MS-EXCEL. Some of them are listed below for quick reference:

- Workbooks
- Worksheets
- Range
- Column
- Row
- Selection
- Windows
- Charts

13.4.2 Methods

Methods refer to action that has to be taken on the object by the computer. Some common methods are listed below

- Activate
- Select
- Add
- Clear
- Close
- Copy
- Cut
- Insert
- Move
- Open
- Printout
- Quit
- Save
- Select

13.4.3 Properties

A property is an attribute of an object that defines one of the object's characteristics, such as size, color, or screen location, or an aspect of its behavior, such as whether it is

enabled or visible. To change the characteristics of an object, you change the values of its properties.

To set the value of a property, follow the reference to an object with a period, the property name, an equal sign (=), and the new property value.

13.4.4 Some Examples

Workbooks.Close	Closes all the open workbooks
Worksheets(“Sheet3”).Delete	Deletes Sheet3
Range(“A1:H8”).PrintOut	Prints the specified range of cells
Columns(“D:E”).Select	Selects columns D & E
Rows("14:14").RowHeight = 20	Sets the height of the 14th row to 20 units
Range("A5").Copy Destination:=Range("A9")	Copies the contents of Cell A5 to Cell A9

13.4.5 Understanding VB Statements

Sub .. End Sub	Denotes the start and end of a macro
With .. End With	If a set of commands are to be performed on a single object, choose the With.. EndWith combination
If…Then…Else…End If	Executes commands in a macro based on certain conditions
Select Case ... Case… End Select	More useful in case of a menu selection
Do While … Loop	Performs a set of commands until a certain condition is met
For … Next	Performs a set of commands for a particular number of items
For Each… Next	Performs a set of commands on each object in a collection

13.4.6 Interactive VB Statements

InputBox()	Asks for some information from the user
MsgBox()	Returns some information to the user

ANNEXURES

1 ANNEXURE A: KEYBOARD SHORTCUTS

Key	Alone	Shift	Ctrl	Alt
F1	Help	What's This Help		Insert Chart Sheet
F2	Edit Mode	Edit Comment		Save As
F3	Paste Name Formula	Paste Function	Define Name	
F4	Repeat Action	Find Again	Close Window	Exit
F5	Goto	Find	Restore Window Size	
F6	Next Pane	Prev Pane	Next Workbook	
F7	Spell Check		Move Window	
F8	Extend Selection	Add To Selection	Resize Window	Macro List
F9	Calculate All	Calculate Worksheet	Minimize Workbook	
F10	Activate Menu	Context Menu	Restore Workbook	
F11	New Chart	New Worksheet	New Macro Sheet	VB Editor
F12	Save As	Save	Open	
A			Select All	
B			Bold	
C			Copy	
D			Fill Down	Data Menu
E				Edit Menu
F			Find	File Menu
G			Goto	
H			Replace	Help Menu
I			Italics	Insert Menu
J				
K			Insert Hyperlink	
L				
M				
N			New Workbook	
O			Open Workbook	Format Menu
P			Print	
Q				
R			Fill Right	
S			Save	
T				Tools Menu
U			Underline	
V			Paste	
W			Close Workbook	Window Menu
X			Cut	
Y			Repeat Active	
Z			Undo	
` (~)			Toggle Formula View	
1 (!)			Cell Format	
2 (@)				
3 (#)				
4 ($)				
5 (%)			Strkethru	

Key	Alone	Shift	Ctrl	Alt
6 (^)				
7 (&)				
8 (*)			Outline	
9 (()			Hide Rows	
0 ())			Hide Columns	
-			Delete Selection	
= (+)	Formula			Auto Sum
[			Direct Dependents	
]			All Dependents	
; (semicolon)			Insert Date	
' (apostrophe)				Style
: (colon)			Insert Time	
/			Select Array	
****			Select Differences	
Insert	Insert Mode			
Delete	Clear		Delete To End Of Line	
Home	Begin Row		Start Of Worksheet	
End	End Row		End Of Worksheet	
Page Up	Page Up		Previous Worksheet	Left 1 screen
Page Down	Page Down		Next Worksheet	Right 1 screen
Left Arrow	Move Left	Select Left		
Right Arrow	Move Right	Select Right		
Up Arrow	Move Up	Select Up		
Down Arrow	Move Down	Select Down		
Space Bar	Space	Select Row	Select Column	Control Box
Tab	Move Right	Move Left	Next Window	Next Application
BackSpace			Goto Active Cell	
Enter	Next Cell	Previous Cell	Fill Entire Selection	Next Line in Same Cell

2 ANNEXURE “B” IMPORTANT EXCEL FUNCTIONS

Name	Description
ABS	Returns the absolute value of a number
ACCRINT	Returns the accrued interest for a security that pays periodic interest
ACCRINTM	Returns the accrued interest for a security that pays interest at maturity
ADDRESS	Creates a cell address as text based on given row and column numbers
AVERAGE	Returns the average (arithmetic mean)
CEILING	Rounds a number (away from zero) to the nearest integer or to the nearest multiple of significance
CELL	Returns information about the formatting , location or contents of the cell or upper left cell of the reference
CHOOSE	Uses a specified index number to select one from up to 29 specified values
CLEAN	Removes all nonprintable characters from text
COMBIN	Returns the number of combinations for a given number of objects
CONCATENATE	Joins several text items into one text item
COUNT	Counts the number of cells that contain numbers and also numbers within the list of arguments
COUNTBLANK	Counts the number of non-empty cells and the values within the list of arguments
COUNTIF	Counts the number of cells that meet the criteria specified in the argument
CUMIPMT	Returns the cumulative interest paid between two periods
CUMPRINC	Returns the cumulative principal paid on a loan between two periods
DATE	Returns the sequential Excel date / time serial number that represents a particular date
DATEDIF	Calculates differences between two dates in terms of specified units and assumptions
DAY	Converts an Excel date / time serial number to the day of a month
EDATE	Returns the Excel date / time serial number of the date that is the indicated number of months before or after the specified number of months from the start date
EFFECT	Returns the effective annual interest rate of a given nominal rate with its compounding frequency
EOMONTH	Returns the Excel date / time serial number of the last day of the month before or after a specified number of months from start date
EVEN	Rounds a number away from zero to the nearest even integer
EXACT	Checks to see whether two text values are identical
FIND	Finds one text value within another (case sensitive)

Name	Description
FIXED	Formats a number as text with a fixed number of decimals
FLOOR	Rounds a number down towards 0 to the nearest integer or to the nearest multiple of significance
FV	Returns the future value of an investment
FVSCHEDULE	Returns the future value of an initial principal after applying a series of compound interest rates
GCD	Returns the greatest common divisor
GETPIVOTDATA	Returns data stored in a pivot table
HLOOKUP	Looks in the top row of a table or array and returns the value of the indicated cell
IF	Returns one value if the specified condition evaluates to TRUE and another value if it evaluates to FALSE
INDEX	Returns a value from a table of values based on references to rows and columns.
INDIRECT	Returns a reference indicated by a value provided as text
INT	Rounds a number away from 0 to the nearest integer
IPMT	Returns the amount of the interest element in a payment for an investment for a given period
IRR	Returns the internal rate of return for a series of cash flows
LCM	Returns the least common multiple
LEFT	Returns the left most characters from a text value
LEN	Returns the number of characters in a text string
LOOKUP	Looks up values in a one row or column range and returns a value in a second one row or column range.
LOWER	Converts text to lowercase
MAX	Returns the maximum value in a list of arguments ignoring logical values and text
MID	Returns a specific number of characters from a string starting at a specified position
MIN	Returns the minimum value in a list of arguments ignoring logical values and text
MINUTE	Converts an Excel date / time serial number to a minute
MOD	Returns the remainder from division with the result having the same sign as the divisor
MONTH	Converts an Excel date / time serial number to a month number
MROUND	Returns a number rounded to the desired multiple. Midway points are rounded away from 0
NOMINAL	Returns the nominal rate equivalent to a given annual effective with a given compounding frequency for the nominal rate
NOW	Returns the Excel date / time serial number of the current date and time
NPER	Returns the number of periods for an investment
NPV	Returns the net present value of an investment based upon a series of periodic cash flows and a discount rate where the first cash flow

Name	Description
	is received at the end of the first period
PERMUT	Returns the number of permutations for a given number of objects that can be selected from a number of objects without replacement
PMT	Returns the periodic payment for an annuity
PPMT	Returns the amount of principal element in a payment for an investment for a given period
PRODUCT	Multiplies together 1 - 30 numbers
PROPER	Capitalizes the first letter in each word of a text value
PV	Returns the present value of an investment
QUOTIENT	Returns the integer portion of a division
RAND	Returns an evenly distributed random number greater than or equal to 0 and less than 1
RANDBETWEEN	Returns a random number between (and inclusive of) two specified numbers
RATE	Returns the interest rate per period of an annuity
REPLACE	Replaces characters within text
REPT	Repeats text a given number of times
RIGHT	Returns the rightmost characters from a text value
ROMAN	Converts an arabic number to Roman, as text
ROUND	Rounds a number to a specified number of digits to the left (-) or right (+) of the decimal point. The midway digit 5 is rounded away from 0.
ROUNDDOWN	Rounds a number down towards 0 to a specified number of digits to the left (-) or right (+) of the decimal point
ROUNDUP	Round a number up away from 0 to a specified number of digits to the left (-) or right (+) of the decimal point
SEARCH	Finds one text value within another (not case sensitive) and returns the number of the starting position
SQRT	Returns a positive square root
SUBSTITUTE	Substitutes new text for old text in a text string
SUBTOTAL	Returns the sutotal in a list or database
SUM	Adds its arguments
SUMIF	Add the cells specified by a given criteria
TODAY	Returns the Excel date / time serial number of today's date
TRANSPOSE	Returns the transpose of an array
TRIM	Removes all spaces from text except single spaces between words
UPPER	Converts text to uppercase
VLOOKUP	Locates a specified value in the leftmost column of a specified table, and returns the value in the same row from a specified column in the table
WEEKDAY	Converts an Excel date / time serial number to the number of the day of the week based upon counting system of return_type
YEAR	Converts an Excel date / time serial number to a year
YEARFRAC	Returns the difference between start_date and end_date expressed

Name	Description
	as a number of years including decimal fraction of a year.

3 ANNEXURE “C”: COMMON ERROR CODES

Error Type	Possible Causes	Recommended Solutions
#######	Column is not wide enough to display the content (text entries however overflow or get truncated without displaying this error message)	1) Increase the width of the column 2) Shrink the contents to fit the column 3) Apply a different number format
	Dates and times are negative numbers	Check the formulae.
#NULL	Use of incorrect range operator	1) Use colon (:) to refer to a contiguous range of cells 2) Use comma (,) to refer to two ranges of cells which do not intersect
#N/A	Missing Data	Replace with data
	Inappropriate Value in the lookup function	Use a single cell as the lookup value and not a range of cells
	Lookup an unsorted table	Sort the table first
	Omitting a required argument from a function	Check the function syntax and supply all the necessary arguments
	Using a customised function which is not available	Make sure the workbook containing the customised function is open
#NAME?	Using a range name which does not exist	Define the range name or check the spelling
	Using labels in formula	Turn on the feature (Tools, Options, Calculation Tab)
	Mis-spelling the name of a function	Correct the spelling
	Entering text in formula without double quotation marks	Surround the text with double quotation marks
	Omitting a colon in a range reference	Select the range by pointing
	Reference to another sheet not enclosed in single quotation marks	Select the range by pointing

Error Type	Possible Causes	Recommended Solutions
#NUM!	Using non-numeric argument for a function which requires numeric arguments	Check the function syntax and supply all the necessary arguments
	Function cannot derive a value (IRR or RATE functions)	Check the values provided for logical mistakes.
#REF!	Cell reference is not valid	If cell was deleted, correct the formula or restore the deleted cell
#VALUE!	Range is supplied where a single value is required	Check the arguments
#DIV/0!	A cell reference which contains either a zero or a blank value is used as a divisor	1) Enter a value other than zero as the divisor 2) Prevent the error by using the IF function with the formula 3) Enter #N/A as the divisor cell reference to display #N/A in preference to #DIV/0!

4 ANNEXURE “D” LIST OF ADD-INS PROVIDED WITH MS-EXCEL

Add In	Utility
Access Links	Provides Microsoft Access forms and reports for use with Excel data lists
Analysis ToolPak	Gives several worksheet functions and macro functions for financial and scientific data analysis for use in a workbook
AutoSave	Automatically saves your workbook at specified intervals
Conditional Sum	Assists you in summing data in lists
HTML	Helps in HTML functions
Internet Assistant VBA	Allows developers to publish Excel data to the Web by using Excel 97 Internet Assistant Syntax
Lookup Wizard	Allows creation of formulas to find data in Excel tables
MS Query	Converts external data ranges in Microsoft Excel 97/2000 format to Excel 95 format. Also allows the use of macros created in VBA in previous versions of Excel
ODBC Add in	Provides drivers for working with SQL based data sources
Report Manager	Lets you format information in worksheets, workbooks and scenarios into organized, uniform reports by combining spreadsheet views with data scenarios
Solver	Lets you determine the answers to complex what if questions or equations by analyzing cells and determining the optimum value adjustments required to arrive at the desired result
Template Utilities	Provides utilities that are automatically used by the Excel’s built in templates
Update Add In Links	Updates the links to Excel add in functions to access the built in functionality in higher versions